76/63
C

The Bancroft Library

University of California • Berkeley

Berkeley
LIBRARY OF THE UNIVERSITY OF CALIFORNIA

All uses of this manuscript are covered by a legal agreement between the Regents of the University of California and Donald H. McLaughlin dated October 25, 1972. The manuscript is thereby made available for research purposes. All literary rights in the manuscript, including the right to publish, are reserved to The Bancroft Library of the University of California Berkeley. No part of the manuscript may be quoted for publication without the written permission of the Director of The Bancroft Library of the University of California at Berkeley.

Requests for permission to quote for publication should be addressed to the Regional Oral History Office, 486 Library, and should include identification of the specific passages to be quoted, anticipated use of the passages, and identification of the user. The legal agreement with Donald H. McLaughlin requires that he be notified of the request and allowed thirty days in which to respond.

The Bancroft Library University of California/Berkeley
Regional Oral History Office

Donald H. McLaughlin

CAREERS IN MINING GEOLOGY AND MANAGEMENT, UNIVERSITY GOVERNANCE AND TEACHING

With an Introduction by
Charles Meyer

An Interview Conducted by
Harriet Nathan

Copy No. /

© 1975 by The Regents of the University of California

Donald H. McLaughlin

S.F. Chronicle

P. 22 1/1/85

OBITUARIES

Donald H. McLaughlin

Donald Hamilton McLaughlin, who championed both the gold standard and the atomic age, died at his Berkeley home early yesterday. He was 93.

Dr. McLaughlin was equally at home in a Harvard classroom, the board chambers of half a dozen powerful business corporations and the rough-and-tumble of the gold fields.

While serving as a regent of the University of California from 1951 to 1967, he opposed the teacher loyalty oath. "They thought I was a liberal," Dr. McLaughlin said. "Not at all. I simply believed it was a silly technique — this loyalty oath — to discharge a professor because he wouldn't take one. Why, a Communist wouldn't hesitate to take a dozen oaths. . . ."

Dr. McLaughlin was born in San Francisco, the son of William McLaughlin and Katherine Hamilton.

He took a bachelor's degree at the University of California at Berkeley in 1914, and quickly followed with a master's (1915) and Ph.D. (1917) from Harvard. He enlisted in the Army in 1917 and served as a lieutenant with the 63rd Infantry until the end of World War I.

Returning to civilian life, he became a geologist with the South American firm of Cerro de Pasco Copper Corp., later becoming its chief geologist and in 1944 its president.

From 1926 to 1944 he was a consulting geologist for the Homestake Mining Co. in South Dakota, the nation's largest producer of gold. Dr. McLaughlin was named president in 1945 and served as chairman until his retirement. He was always a proponent of restoring the gold standard.

He held 10 corporate directorships during his lifetime, including membership on the boards of Western Airlines and Wells Fargo Bank.

Dr. McLaughlin also served on the U.S. Atomic Energy Commission, the U.S. Geological Survey and the National Science Board of the National Science Foundation.

While serving at Berkeley, he endorsed the construction of the Lawrence atom smasher on the campus, the first step in a long line of atomic research, for peaceful energy and atomic weaponry.

Dr. McLaughlin was a member of 15 professional, academic and civic organizations that ranged from Phi Beta Kappa to Sociedad Geologica del Peru to the San Francisco Conservatory of Music.

He was married twice. His first wife, Eleanor, died in 1941. They were the parents of Donald H. McLaughlin and Charles C. McLaughlin.

In 1948, Dr. McLaughlin married Sylvia Cranmer, of a prominent Denver family. Two children were born of this marriage: George C. McLaughlin and Jean Katherine McLaughlin Boucher.

His wife and children survive him.

Funeral services will be held at 3 p.m. Friday in St. Clement's Episcopal Church in Berkeley. The family prefers contributions to Save the Redwoods League, the University of California's engineering fund or a favorite charity.

McLAUGHLIN, Donald H. -- in Berkeley, December 31, 1984; husband of Sylvia C. McLaughlin of Berkeley; father of Donald H. McLaughlin Jr. of Massachusetts, Charles C. McLaughlin of Washington D.C., Joanie McLaughlin Shaterian & George C. McLaughlin both of Berkeley; grandfather of Stephen, Katherine, David, Brian, John and Ellen McLaughlin; great-grandfather of Kristen, Jan & Jonathan McLaughlin; a native of San Francisco; age 93 years.
Friends are invited to attend Memorial Services Friday, January 4, 1985 at 3:00 p.m. in St. Clement's Episcopal Church Chapel, 2837 Claremont Blvd., Berkeley. Dr. Gordon D. Griffith will officiate.
Arrangements By:
McNARY-MORGAN & ENGEL
Oakland 848-1238

Minor typographical corrections in Donald H. McLaughlin Oral History:

p. 115, line 17	Backus, (not Buckus)
p. 138, line 13	San Andreas Rift, (not Calaveras Rift)
p. 151, line 4	Coolidge Hill, (not Cambridge Hill)
p. 153, line 25	Piaxtla, (not Piostla)
p. 183, line 34	La Sal, (not LaSall)
p. 188, line 12	600, (not 300)
p. 203, line 2	unconformably, (not uncomfortably)
p. 212, line 18	We may say, (not We way that)
p. 215, line 26	Cost per ounce, (not price per ounce)
p. 249, line 27	uranium in the ore mined there, (not uranium ore we mine here)
p. 266, line 5	intrusive crystalline rock with nickel-copper ore bodies, not intrusive nickel copper ore bdiés

TABLE OF CONTENTS -- Donald H. McLaughlin

	PREFACE	i
	INTRODUCTION	v
	INTERVIEW HISTORY	vii
I	FAMILY AND EARLY YEARS IN THE BAY AREA	1
	Grant School in Oakland	5
	McKinley School in Berkeley	6
	The Old Anna Head School and Later Developments	6
	The 1906 Earthquake	8
II	WITH MRS. HEARST IN FRANCE AND ITALY	10
III	MRS. HEARST AND THE HACIENDA AT PLEASANTON	13
	Party for the Class of 1914	14
	The House: Schweinfurth and Julia Morgan	15
	Lands, Water and Equipment	17
	William Randolph Hearst	21
	Visitors and Residents at the Hacienda	24
IV	THE UNIVERSITY OF CALIFORNIA: MINING, GEOLOGY, AND CAMPUS PLANS	30
	An Interest in Geology	31
	Changes in the Curriculum	33
	Scholastic Honors	34
	Geology and Field Work	37
V	A REGENT'S PERSPECTIVE	39
	Campus Architecture at U.C. Berkeley	39
	Committee for a New Plan	41
	Some Personal Views on Campus Buildings	43
	The Santa Cruz Campus	48
	The Irvine Campus	49
	Systematic Campus Plans	50
	Growth and Academic Standards for the University	51
	The Tuition Question	56
	Governor Warren and Appointment to the Board of Regents	56
	Some Observations on Warren and the Court	57
	Provosts, Chancellors and Presidents	60
	The Regents' Scholarship Program	71
	Committee on Educational Policy	72

	Alienation and the Free Speech Movement (1964-1965)	77
	Student Violence	80
	The Loyalty Oath (1949-1952)	83
VI	THE HARVARD YEARS	88
	Faculty Members and Colleagues	88
	A Fellowship Award	91
	Copper Mines and Summer Jobs	93
VII	ARMY SERVICE: WORLD WAR I	101
VIII	CERRO DE PASCO: COPPER MINING IN PERU	106
	Some History and Geology of the Cerro de Pasco District	108
	The Syndicate and the Railroad	113
	The Use of Geology in the Mines	118
	Problems of Metallurgy	118
	Rich Ores and Concentrates	119
	A View of Lima	123
	The Cerro de Pasco Corporation	124
	Financing and Participation	126
	Nationalism,Politics and Development	128
IX	EARTH MOVEMENT AND MINERAL DEPOSITS	132
	The Peruvian Earthquake (1970) and the Gorge	132
	Some California Earthquakes	136
	The Pacific Belt of Fire	137
	Formation of Mineral Deposits	139
	Geologic Sleuthing	142
	The Theory of Continental Drift	146
	A Side Glance at the Greek Theatre	148
X	RETURN TO HARVARD: A PROFESSOR	150
	Marriage and Family	150
	Summers at Homestake or San Luis	152
	Harvard Colleagues	154
XI	GOLD: GEORGE HEARST AND THE HOMESTAKE MINE	160
	Homestake: Low Grade or High-Grade?	161
	Hearst and Daley: Anaconda Copper Mines	162
	Water and Timber for Homestake	164
	Reassessing Homestake	168
	Management Aspects of Homestake	170
	Connection Between Homestake and Cerro de Pasco	174
	Edward Clark's Tenure and the Building of a Board	177
	Moving Into Uranium	182
	Interest in Other Metals	187
	Problems of Financing Foreign Development	187
	Labor Relations and the United Steel Workers	189
	Potash in Canada	196

XII	SOME PERSONAL NOTES, AND A FAMILY HOME IN BERKELEY	199
	The Cranmers of Denver	199
	Marriage to Sylvia Cranmer	200
	Walter Case and Case,Pomeroy	201
	Maynard Keynes and the Dow Jones Index	203
XIII	GOLD AND THE MONETARY SYSTEM	204
	The Two-Tier System	207
	The Discipline of Gold	212
	The Crest of the Spanish Tide and the Supply of Gold	216
	Hoarding: Three Categories	218
	Gold as a Commodity Base for Money	219
	Fiat Money	222
	Gold Standard and Other Controls	223
	Gold Dredging in Alaska	225
	Large-Scale Prospecting	225
	Metals in the Sea	227
	Gold Coinage	229
	Bullion and Nuggets	230
	Chamber of Mines of South Africa	231
	A Second Look at Gold Policy	233
	Conferences on Gold	233
XIV	THE ATOMIC ENERGY COMMISSION, URANIUM AND NUCLEAR ENERGY	239
	Homestake and Uranium Development	241
	AEC Contracts for Purchase	242
	Advisory Committee on Raw Materials, AEC	244
	Management, Exploration and Partnership	248
	Uranium in Other Association	251
	Uranium Uses and Prices	252
	Plowshare Advisory Committee	254
	Plowshare and "Chariot"	256
	Explosions Deep in the Earth	257
	Atomic Energy Commission and the University of California	260
XV	INTERNATIONAL NICKEL COMPANY AND SOME GEOLOGIC CONCEPTS	265
	Geology of the Sudbury District	266
	A Moon-Type Crater in Arizona	267
	Some Newer Developments in Geology	268
	Demand for Metals	271
XVI	RESEARCH AND OTHER ASPECTS OF THE ACADEMIC WORLD	274
	The National Science Board and the Foundation	274
	Faculty Promotion and Tenure	281
	Overdoing the Ph.D.	282
	Observations Concerning Regents	285

XVII SOME PUBLIC POSTS 288
Hoover Commission Recommendations and the Public Lands 288
Advisory Committee, U. S. Geological Survey 291

APPENDIX I
Career Summary 294

APPENDIX II
List of Speeches 299

APPENDIX III
LL.D. Citation, University of California, Berkeley, 1966 304

INDEX 306

Addendum to Oral History of D.H. McLaughlin added by Mrs. McLaughlin Aug. 1989

Under Government Service

1947-1949 Natural Resources Task Force of the U.S. Commission on Organization of the Executive Branch of the Government, Herbert Hoover, Chairman

Appointed by President Dwight Eisenhower

Natural Resources Task Force Members:

Leslie A. Miller, Chairman - Former Governor Wyoming

Horace A. Albright - Former Director National Park Service

John Dempsey - Former Governor New Mexico

Ralph Carr - Former Governor Colorado

Donald H. McLaughlin - President Homestake Mining Co.

Dr. Isaiah Bowman - President Emeritus Johns Hopkins University

Dr. Gilbert White - President Haverford College

Professor Samuel T. Dana - Dean, School of Forestry and Conservation, University of Michigan

Reference: U.C. Berkeley Library
Documents Department

JK 643
C47A55

Vol.2 contains Concluding Report To Congress

DONALD HAMILTON McLAUGHLIN
1450 Hawthorne Terrace
Berkeley, California 94708
(415) 848-0699

Born December 15, 1891 at San Francisco, California. Married Eleanor Eckhart 1925-1941; children: Donald Hamilton, 7-15-26; Charles Capen, 1-20-29. Married Sylvia Cranmer 1948; Children: Jean Katherine, 2-14-53; George Cranmer, 5-16-55. Parents: William Henry McLaughlin and Katherine (Hamilton) McLaughlin. Deceased December 31, 1984.

Positions held with Homestake Mining Company

Consulting Geologist	1926-1944
Director	1943-1981
President and Chief Executive	1944-1961
Chairman of the Board	1961-1970
Chief Executive Officer	1961-1962
Honorary Chairman of the Board Chairman, Executive Committee	1970-1981
Chairman of the Board Emeritus Consultant	1982-1984

Other positions:

Date	Employer	Position
1919-1925	Cerro de Pasco Corporation	Chief Geologist
1925-1941	Harvard University	Professor and Chairman of Department of Geology and Geography and Division of Geological Sciences
1941-1942	University of California	Dean, College of Mining
1941-1943	University of California	Professor of Mining Engineering
1942-1943	University of California	Dean, College of Engineering
1943-1945	Cerro de Pasco Corporation	Vice President
1944-1945	Cerro de Pasco Corporation	General Manager

Education:

Date:	School
1910-1914	University of California
1914-1917	Harvard University
	Degrees
1914	Bachelor of Science, University of California
1915	Master of Arts, Harvard University
1917	Ph.D.
	Doctor of Engineering (Honorary)
1950	South Dakota School of Mines and Technology
1950	Michigan College of Mines and Technology
1950	Montana School of Mines
1955	Colorado School of Mines
1966	LLD - University of California, Berkeley
	Military Service
1917-1919	First Lieutenant, Infantry, U. S. Army

Other activities:

Memberships in professional, academic or civic organizations

American Institute of Mining, Metallurgical and Petroleum Engineers
President 1950
Honorary Member 1958
Rand Medalist 1961

Mining and Metallurgical Society of America
President 1953

Sociedad Geologica del Peru
Honorary Member

Society of Economic Geologists
President 1938

Geological Society of America
Councillor 1934-1936

Other activities: (continued)

Memberships in professional, academic or civic organizations (continued)

American Academy of Arts and Sciences
Councillor 1939-1942
Member of the Executive Committee, Western Division 1972-1975

San Francisco Conservatory of Music, Trustee 1964-1973

Harvard Alumni Association, Director 1946-1949

Council on Foreign Relations 1945-1976

Palace of Arts and Sciences Foundation 1969-1976
(later became the Exploratorium)

Harvard Foundation for Advanced Study and Research 1954-1959

Overseers Committee to Visit the Graduate School of Engineering
Harvard University 1945-1948
Committee to Visit the Department of Geological Sciences,
Harvard University 1943-1957; 1973-1975

Committee for Economic Development, Trustee 1960-1962

Stanford University Earth Sciences Advisory Board 1969-1982

Board of Directors, International House, University of California at Berkeley 1966-1976

Friends of the Bancroft Library Council, University of California at Berkeley 1961-1969

Save the Redwoods League Council 1958-1983

Business or Trade Associations

International Chamber of Commerce Member, Committee on Monetary Policies

Corporate Directorships

American Trust Company 1947-1960

Wells Fargo Bank 1960-1968
Emeritus 1968-1974

Bunker Hill Company 1949-1968

Cerro de Pasco Copper Corporation 1943-1961

The Dorr-Oliver Company 1944-1955

Corporate Directorships (continued)

Empire Trust Company 1945-1959

The International Nickel Company of Canada, Ltd. 1948-1973
Member Advisory Committee 1972-1978

San Luis Mining Company 1944-1979
Vice President 1948-1973

Triumph Mining Company 1947-1973

Western Airlines 1954-1966
Emeritus 1966-1984

Government

Atomic Energy Commission
Chairman, Advisory Committee on Raw Material 1947-1952
Member, Plowshare Advisory Committee 1959-1972

U. S. Geological Survey
Member, Advisory Committee 1950-1965

National Science Board, National Science Foundation
Member 1950-1960

Natural Resources Task Force of the U. S. Commission on Organization of the Executive Branch of the Government, Herbert Hoover - Chairman;
Appointed by Preseident Eisenhower 1947-1949

Educational

Coordination Council for Higher Education (California)
Member 1960-1966

University of California
Regent 1951-1967
Chairman of the Board 1958-1960
Member of the Council, Alumni Association 1972-1976
Professor of Mining, Emeritus 1966-1984
Berkeley Fellows 1968-1984

San Francisco Conservatory of Music, Trustee 1964-1973

Harvard Alumni Association, Director 1946-1949

Council on Foreign Relations 1945-1976

Palace of Arts and Sciences Foundation, Chairman 1969-1972
(later became the Exploratorium)

Harvard Foundation for Advanced Study and Research 1954-1959

Educational (continued)

Member Overseers Committee to Visit the Graduate School of Engineering, Harvard University 1945-1948

Social

Bohemian Club - San Francisco

Century Association - New York

Cosmos Club - Washington, D. C.

Engineers Club - San Francisco

Pacific Union Club - San Francisco

University Club - New York

World Trade Club - San Francisco

Awards

Rand Medal (American Institute of Mining, Metallurgical and Petroleum Engineers) Awarded in 1961 (Gold medal)

Ambrose Monell Medal and Prize (Gold Medal and $20,000) Awarded May 1964 by Columbia University

Resolution of Commendation, Assembly, California Legislature 1966

Centennial Year Honors, University of California, Santa Cruz 1968

Centennial Year Honors, University of California, Berkeley 1968

Award for Contributions to Mining Industry, Northwest Mining Association 1967

The Golden Plate Award, American Academy of Achievement 1972

Distinguished Engineer Alumnus Award, Engineering Alumni Society, University of California, Berkeley 1975

Distinguished Member of Society of Mining Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers 1975

Alumnus of the Year Award, California Alumni Association, Berkeley 1977

Distinguished Achievement Award, International Precious Metals Institute. 1981

Honors

College of Engineering at University of California at Berkeley named McLaughlin Hall in 1966

First Honorary President, University of California Berkeley Mining Association in 1982

Chair in Mineral Engineering established at University of California Berkeley College of Engineering in 1984

Homestake Mining Company named the McLaughlin Deposit in Napa, Lake and Yolo Counties in 1983

The McLaughlin Deposit was dedicated as the McLaughlin Mine in 1985

Honoree, the Exploratorium Awards Dinner in 1980

Memberships in Honorary, Professional and Social Organizations

Phi Beta Kappa, Sigma Xi, Tau Beta Pi, Kappa Sigma, Golden Bear (University of California at Berkeley)

American Academy of Arts and Sciences (Councillor 1939-1942)

Member of American Institute of Mining, Metallurgical and Petroleum Engineers 1914-1984 (President - 1950; Honorary Member - 1958)

Fellow Geological Society of America (Councillor 1934-1936)

Society of Economic Geologists (President - 1938)

Mining and Metallurgical Society of America (President - 1953)

Council on Foreign Relations (New York)

Sociedad Geologica del Peru (Honorary Member)

Other

Who's Who in America (since 1927)

The International Who's Who (Europa)

American Men of Science

Who's Who in Science

PREFACE

Under a grant from the University of California Alumni Foundation, the Regional Oral History Office has been conducting a series of interviews with persons who have made a significant contribution to the development of the University of California at Berkeley. A list of University History interviews follows, including an earlier group which had been conducted in cooperation with the Centennial History Project, directed by Professor Walton E. Bean. The Alumni Foundation grant has made it possible to continue this University-centered series, of which this memoir with Donald H. McLaughlin is a part. In addition, partial funding for the memoir came from the National Endowment for the Humanities, matched by funds from The Friends of The Bancroft Library, as a part of the Earl Warren Era Project.

The University History interviews have benefited greatly from the expert advice and assistance of Richard E. Erickson, Assistant Chancellor, Development; Arthur M. Arlett, Intercollegiate Athletic Coordinator for Alumni and Public Relations; Verne A. Stadtman, Centennial Editor; and J. R. K. Kantor, University Archivist.

The Regional Oral History Office was established to tape record autobiographical interviews with persons prominent in recent California history. The Office is under the administrative supervision of James D. Hart, the Director of The Bancroft Library.

Willa K. Baum
Department Head
Regional Oral History Office

15 July 1975
Regional Oral History Office
Room 486 The Bancroft Library
University of California
Berkeley, California

UNIVERSITY HISTORY SERIES

SERIES I

Adams, Frank	Frank Adams, University of California on Irrigation, Reclamation, and Water Administration. 1956
Birge, Raymond Thayer	Raymond Thayer Birge, Physicist. 1960
Chaney, Ralph Works	Ralph Works Chaney, Ph.D., Paleobotanist, Conservationist. 1960
Foster, Herbert B.	The Role of the Engineer's Office in the Development of the University of California Campuses. 1960
Hildebrand, Joel H.	Chemistry, Education, and the University of California. 1962
Hutchison, Claude B.	The College of Agriculture, University of California, 1922-1952. 1962
Lessing, Ferdinand D.	Early Years. 1963
Lenzen, Victor F.	Physics and Philosophy. 1965
Merritt, Ralph P.	After Me Cometh a Builder, the Recollections of Ralph Palmer Merritt. 1962
Meyer, Karl F.	Medical Research and Public Health. 1976
Mitchell, Lucy Sprague	Pioneering in Education. 1962
Olney, Mary McLean	Oakland, Berkeley, and the University of California, 1880-1895. 1963
Neuhaus, Eugen	Reminiscences: Bay Area Art and the University of California Art Department. 1961
Neylan, John Francis	Politics, Law, and the University of California. 1962
Pepper, Stephen C.	Art and Philosophy at the University of California, 1919 to 1962. 1963
Porter, Robert Langley	Robert Langley Porter, Physician, Teacher, and Guardian of the Public Health. 1960
Richardson, Leon J.	Berkeley Culture, University of California Highlights, and University Extension, 1892-1960. 1962

Shields, Peter J.	Reminiscences. 1954
Sproul, Ida Wittschen	Duty, Devotion and Delight in the President's House, University of California. 1961
Stevens, Frank C.	Forty Years in the Office of the President, University of California, 1905-1945. 1959
Treadway, Walter	Correspondence and Papers on Langley Porter Clinic. (Bound into Langley Porter interview.) 1960
Waring, Henry C.	Henry C. Waring on University Extension. 1960
Woods, Baldwin M.	University of California Extension. 1957
Wurster, William Wilson	College of Environmental Design, University of California, Campus Planning, and Architectural Practice. 1964

SERIES II

Interviews fully or partially funded by the University of California Alumni Foundation.

Blaisdell, Allen C.	Foreign Students and the Berkeley International House, 1928-1961. 1968
Corley, James V.	Serving the University in Sacramento. 1969
Cross, Ira Brown	Portrait of an Economics Professor. 1967
Cruess, William V.	A Half Century in Food and Wine Technology. 1967
Davidson, Mary Blossom	The Dean of Women and the Importance of Students. 1967
Dennes, William R.	Philosophy and the University Since 1915. 1970
Donnelly, Ruth	The University's Role in Housing Services. 1970
Ebright, Carroll "Ky"	California Varsity and Olympics Crew Coach. 1968
Gordon, Walter A.	(1975 - in process)
Evans, Clinton W.	California Athlete, Coach, Administrator, Ambassador. 1968.
Grether, Ewald T.	(1975 - in process)

Hamilton, Brutus	Student Athletics and the Voluntary Discipline. 1967
Hays, William Charles	Order, Taste, and Grace in Architecture. 1968
Johnston, Marguerite Kulp and Mixer, Joseph R.	Student Housing, Welfare, and the ASUC. 1970
McLaughlin, Donald	Careers in Mining Geology and Management, University Governance and Teaching. 1975
Lehman, Benjamin H.	Recollections and Reminiscences of Life in the Bay Area from 1920 Onward. 1969
Robb, Agnes	recollections concerning Robert Gordon Sproul (1975 - in process)
Towle, Katherine A.	Administration and Leadership. 1970
Underhill, Robert M.	University of California Lands, Finances, and Investment. 1968
Wessels, Glenn A.	Education of an Artist. 1967
Witter, Jean C.	The University, the Community, and the Lifeblood of Business. 1968

INTRODUCTION

AN APPRECIATION

OF

DONALD HAMILTON McLAUGHLIN

The greatness of a few men is somehow self-evident in their mere presence. Dr. Samuel Johnson's appraisal of Edmund Burke could as readily be applied to Donald Hamilton McLaughlin; "You could not stand with that man beneath a shed while it rained, but you must be convinced you had been standing with one of the greatest men you had ever seen." It is no secret that most professors do not impress their students that way, but to those of us fortunate enough to sit in his classes at Harvard in the nineteen thirties and early forties, it has come as no surprise that Professor McLaughlin is now one of the most beloved and honored men in the fellowship of the University of California as well as in the mining profession throughout the world.

Both the University and the mining profession have awarded him their highest honors: Doctors of Laws and Letters, Chairman of the Board of Regents; President and Rand Medallist of the American Institute of Mining Engineers, President of the International Society of Economic Geologists, President and Chairman of the Board of one of America's finest industrial organizations, the Homestake Mining Company.

But even these top awards inadequately acknowledge the enormous contributions McLaughlin has made to the people of the United States through his advice on the country's mineral and research policy, especially through the National Science Foundation. Too bad his advice has not been followed on monetary policy as well!

Clearly, many characteristics of this man contribute to his great stature, but perhaps the most significant is his genius for precise and penetrating observation and insight to define the <u>premises</u> of an argument before it is driven to a logical conclusion. He would have been outstanding even in the illustrious company of the "French Enlightenment." As a practicing mining geologist in the high Cordillera of Peru in his early career,

he developed exacting engineering methods for recording geologic observations and for evaluating geologic problems. These analytical skills have helped him assess problems of human relations as well, for natural systems of rocks and ores are in some ways much like human social systems - exceedingly complex with myriads of interacting variables. He is a keen observer of past and present human behavioral patterns, and therefore possesses the predictive capacity of a truly enlightened historian. Almost alone among American leaders he has steadfastly maintained his conviction that in times of economic crisis, humanity will predictably turn to lasting values - eternally represented by gold. This was an unpopular view for many years after World War II, during the time when international bankers built their intricate (and unstable) credit exchange systems, and politicians managed their accelerating public debts by confiscating individual savings through "controlled" inflation. The full reckoning is clearly still ahead, but McLaughlin's persistent prophecy of the return to gold has already been fulfilled. Indeed, "time will run back and fetch the age of gold," as John Milton forewarned.

Of course, the same intellectual honesty and powers of observation that made Donald McLaughlin a superb scientist also insure that he is an outstanding humanist. He sees in balance the gigantic artistic achievements of the past and the technological advances of the present, lamenting at the same time that artistic endeavor seems diminished in this age of technology.

During the period in the recent past when over-zealous social consciousness prompted irrational response on the part of University students, he pleaded as a Regent for moderation on both sides - applauding the moral concern of the students, but noting their neglect of intellectual and moral discipline. "No generation is likely to be satisfied with what its predecessors have accomplished, but no one is entitled to be taken seriously until he has acquired an adequate understanding of the tremendous achievements of the past." That remark serves to distinguish scholarly revolutionaries like Jefferson and Madison from the great crowd clamoring constantly for attention. It is the only hope for intellectual growth of the species and therefore for the continuing ascendency of man. It is an enduring model for living.

There are few complete men in any age. Our age is fortunate to be graced with the presence of one of the finest - Donald Hamilton McLaughlin.

Charles Meyer
Professor

January 1975
Department of Geology and Geophysics
University of California at Berkeley

INTERVIEW HISTORY

Donald Hamilton McLaughlin's life and interests have remained closely linked to his hometown, Berkeley, and to his alma mater, the University of California. He has been an undergraduate, B.S. '14, and honored with an LL. D. '66; a professor and dean on the campus, as well as Chairman of the University's Board of Regents and of two major board committees (educational policy and grounds and buildings.) Consequently, his knowledge and experience of the University have long made him a prime candidate for an oral history memoir. But as Charles Meyer notes in his introduction, and as the memoir itself reveals, teaching and advanced degrees at Harvard, worldwide mining interests and responsibilities as well as government service further enriched Mr. McLaughlin's already active and productive life and greatly broadened the scope of his reminiscences and his distinctive Oral History.

A preliminary conversation was held at Donald McLaughlin's office at the Homestake Mining Company, 650 California Street, San Francisco on December 19, 1969. Correspondence had begun in 1967, to develop the possibility of an oral history memoir that would be placed in the University History series, and would be supported in part by grants from the Alumni Foundation of the University of California, and by individual contributors. In addition, portions of the memoir that concerned developments during the Earl Warren years received support, as part of the Earl Warren Era Project, from funds of the National Endowment for the Humanities.

The tape-recorded interviews, nine in all, were conducted in the study of the McLaughlin home at 1450 Hawthorne Terrace in the hills north of the Berkeley campus. Interviews were transcribed, lightly edited, then submitted for review and approval by the memoirist.

Interview dates included:

I	January 30, 1970	IV	May 1, 1970	VII	October 30, 1970
II	February 27, 1970	V	May 15, 1970	VIII	January 15, 1971
III	March 26, 1970	VI	June 12, 1970	IX	February 19, 1971

Interviews began promptly at 9 a.m. and lasted typically from an hour and a half to a little over two hours. They were spaced in the intervals between Mr. McLaughlin's meetings, appointments, conferences, and travels to several continents. Alert and at ease in a favorite armchair, he spoke with the command of a professor, the precision of a scientist, and the wit of a raconteur. In movement, aspect, and mental processes he appeared far younger than his actual age, a man who could easily be pictured on horseback field trips high in the Andes, descending booted and helmeted into a mine, or alternatively presiding at a meeting of the Regents or a corporate board of directors, or

attending an international conference.

He spoke with appreciation and affection of Phoebe Apperson Hearst, of the life he enjoyed for periods at her Hacienda in Pleasanton during the years when his mother was in Mrs. Hearst's employ, of their travels in Europe, and of Mrs. Hearst's interest in and support of his education. He also recounted examples of her profound and lasting interest in the University and its students; how she provided parties and social events for the young women; and how this interest was further expressed through support of building projects and participation in discussions of University policies.

The University has remained a vital element and interest in his own life as well, and became even more significant when his friend Earl Warren named him to the University's Board of Regents.

In a rare mixture of academic and professional specialist careers, Mr. McLaughlin has moved repeatedly from campus to mining responsibilities and back again. He has been concerned with a variety of metals including copper and nickel, but it was gold that captured his imagination. Although he disclaimed any expertise in national and international gold policy and pricing, his discussions and forecasts proved to be accurate to an almost uncanny degree.

He spoke with pleasure of his wife and family, his friends and colleagues, his teachers and students. As he indicated in a letter to the interviewer, he recognized in himself a tendency to avoid discussing at any length "most of the personal associations and the more intimate aspects of my life..." Whether brief or not, however, his comments revealed a genuine warmth and appreciation of personal qualities. His astringent wit was reserved for policies and issues in the public realm. There he discovered a rich and apparently endless vein of absurdity, illogic and disjointed thinking, which he transformed into aphorisms touched with disarming amusement, sharpened by precision, and stated with characteristic clarity.

Harriet Nathan
Interviewer-Editor

15 July 1975
Regional Oral History Office
486 The Bancroft Library
University of California at Berkeley

I FAMILY AND EARLY YEARS IN THE BAY AREA

McL: That's a formidable list of topics [referring to outline] but it does bring us back to the first part of the story. [Laughter] My father was a doctor in San Francisco, an M.D. He died in 1898 when he was two days over forty.

N: What was his name?

McL: William Henry McLaughlin.* Mother was a golden redhead with brown eyes, a lovely complexion--really a very beautiful young woman. She had to get a job and was employed by Phoebe Hearst just about at the turn of the century, after my father died.

N: And what was her name?

McL: Katherine Hamilton McLaughlin. I don't know just how she got the job, but I think she was making some things for an organization that was called the "Woman's Exchange." Her work attracted Mrs. Hearst's attention and Mrs. Hearst asked her to do various things for her. That started an association that lasted until Mrs. Hearst's death about twenty years later.

My mother had so many different assignments, it is hard to say just what she was doing for Mrs. Hearst. Sometimes she ran

---

*Some of the family data include:
William Henry McLaughlin (father of DHMcL) - born Oct. 5, 1858, died Oct. 7, 1898.
Elizabeth McLaughlin (mother of WHMcL) - born Sept. 3, 1820, died February 4, 1904.
Mary Frances McLaughlin (sister of WHMcL) - born Dec. 2, 1856, died Dec. 3, 1935.
Katherine Hamilton McLaughlin (mother of DHMcL)-born Oct. 20, 1860, died April 30, 1948.

McL: the house at Pleasanton - the Hacienda - and handled some of Mrs. Hearst's secretarial work. At the time Mrs. Hearst spent a couple of years in Berkeley, my mother was there with her, looking after a number of things around the campus in connection with the entertaining that Mrs. Hearst was doing for the students, particularly the girls. Mrs. Hearst was disturbed that the co-eds in those days really had little good social life, at least as she saw it. Few of them seemed aware of the proper things a young Victorian lady should know! [Laughter] So she had a series of musicales and dinner parties, entertainment of that sort, rather elaborate in nature.

At first, Mrs. Hearst rented the Pennoyer house, then at Channing Way and Piedmont Avenue and built a large hall, designed by Bernard Maybeck, on a lot immediately to the west. The hall was used for a series of musicales and receptions. A group of tapestries, known as the Coriolanus set, was exhibited in the main hall--indeed the form of the recessed windows and the sloping walls timbered with redwood shakes may have been planned with them in mind. The building was constructed so that it could be moved in segments, as it was later, to a site on the campus north of Bancroft Way and west of Piedmont Avenue. It was then remodeled to serve as a gymnasium for the women students. It was built of redwood--with heavy timbers and long shakes in place of the shingles that were so generally used in early Berkeley houses. It was one of Maybeck's most remarkable and successful structures. It burned down more than thirty years ago. Mrs. Hearst also spent a winter in two houses now standing in the wedge between Scenic Avenue and LeConte Avenue, just south of the top of what some irreverent people now call Holy Hill. The Benjamin Ide Wheelers then lived in the house on Scenic Avenue immediately to the south. Mrs. Hearst, I believe, owned the crest of the hill west of the intersection of Scenic, LeConte and LeRoy Avenues, but later decided not to build, and sold the ground which was eventually occupied by one of the schools of religion.

And I think Mrs. Hearst founded a couple of living clubs for women in Berkeley. I am not sure if any of them have survived. I really don't remember much about them. But she was very anxious to improve the life of the young women on the campus. Mother was very much involved with her activities at that time.

N: Your mother sounds versatile and like a good person to have around. She apparently could do whatever was needed.

McL: Yes. I think she had a very nice way of getting along with people. She really was an attractive person. When she died, just before her 89th birthday, her hair was still half red, and half white.

McL: I called her a strawberry roan, if you know that type of horse. I had reddish hair when I was a boy, but my father who had dark hair was quite white when he died at 40, so I inherited my white hair from him, even though I had my mother's reddish hair.

N: I think you had the best of both! [Laughter] Tell me a little more about your mother. Where did she grow up?

McL: Both my mother and father were born in Folsom, California. That was before the prison was built there, I hasten to say. Their parents were pioneers who came in the '50s. I haven't really made much effort to study just what they did or where they came from, except that my father's mother was English. I remember her telling about coming across the Isthmus. She always called it "The Isthmus of Aspenwall." The town on the Caribbean side at that time was named Aspenwall, after one of the builders of the first railway. It's now called Colon. It seems so typically English for the little girl to remember the place as "The Isthmus of Aspenwall." That was before the railroad was built--or at least before it was completed and functioning--for she said she was carried across some of the marshes on men's backs. She survived the mud and the fever and eventually reached California. I really must look into the family records a little deeper!

N: Only if it interests you. I'm sure your interests lie in many directions.

McL: I am afraid they do. But I am sorry that I haven't paid much attention to my forebears.

N: Was your father educated in California, then?

McL: Yes. He came to San Francisco and went to a medical school which I think is now defunct. It may have been a forerunner of the Cooper Medical College. A life-long friend of my parents was a fellow student of my father, Dr. O. D. Hamlin, whose son is Judge Oliver Hamlin.

N: I see. Did you have any brothers or sisters?

McL: No. I'm an only child.

N: Did you live in Berkeley, then, before you went to Pleasanton?

McL: No. We lived in San Francisco. After my father died, my mother and I lived with an aunt in Oakland on what was then called Albion Street, which at the time, was an attractive tree-lined street. The house was between Telegraph Avenue and Grove. It was a street of nice, old gingerbread houses with really attractive gardens. It

Katherine Hamilton McLaughlin
in Sacramento about 1880

Katherine Hamilton McLaughlin
1860-1948
Photograph circa 1890

William Henry McLaughlin
1858-1898

Donald McLaughlin and Evelyn Wagner
c. 1900

Mary Frances McLaughlin, (left); Katherine McLaughlin, (right); on ladder from the top - Donald McLaughlin, Evelyn Wagner, Laura Caltin.
552 Albion Street, Oakland, California
c. 1900

McL: has become, of course, a very down-at-the-heel neighborhood since then. I took Jeanie and George down there a year or so ago to show them the old house and found nothing but the freeway that now slices through the area. The house had completely disappeared. In those days, it was really not far from the northern edge of Oakland. Between there and Berkeley was a good deal of empty country then.

I remember going to Sunday School at a red wooden church that is still standing on the corner of 29th Street and Telegraph Avenue. It still gives a little of the feeling of that old part of town--lovely trees and gardens. But how the area has changed!

Mother then was living most of the time with Mrs. Hearst and was in Washington with her one winter.* I was living with my aunt and going to school in Oakland.

N: What was your aunt's name?

McL: Mary Frances McLaughlin. She was my father's sister. She was the guardian of an elderly and gentle old person named Gee, who had been declared incompetent. He was well-off, and he had no relatives. The court appointed my aunt his guardian, and she looked after his house and affairs.

After his death in 1902, my aunt and my grandmother joined us in Berkeley, where my mother had built a house--a flat--at 1629 Euclid Avenue between Virginia and Hilgard Streets. It was one of the first houses in Berkeley designed by John Galen Howard. David Farquharson, who had done some work for the University and also for Mrs. Hearst at the Hacienda, was the builder. Mother lived there until the house was burned in the big Berkeley fire of 1923, after which she moved to an apartment at 1403 Hawthorne Terrace and later to 1435 Hawthorne Terrace. When I came to Berkeley as a dean in 1941 I bought the house which had been built shortly after the fire by my old High School teacher known as "Pop" Clark.

When we moved to Berkeley, a street car line had just been built up Euclid Avenue as far as Hilgard, where it stopped at the bottom

---

*The Hearsts lived at 1400 New Hampshire Avenue when George Hearst was in Washington as a Senator. After his death, Mrs. Hearst kept the house for several years, during which time she was particularly interested in the organization (largely made up of women) that preserved Mt. Vernon. I think she gave the money for a "sea wall" to check erosion of the low cliff facing the Potomac. Her activities in the Parent and Teachers Association date from this time also, I believe.

McL: of the first really steep hill. Everybody travelled by street car then. The trolley cars were really very convenient. I don't believe there were more than a dozen houses above the steep hill on Euclid Avenue that goes across Cedar Street. It was just empty country beyond there. A quarter of a mile farther up, there was a farmhouse with some cypresses around it--a hundred yards or so southwest of the reservoir. The owners always put out a bucket of water from their well for the hikers who passed by. A road that became quite steep took off from there over the ridge to Wildcat Cayon, which is now part of Tilden Park.

That was a very nice place for a boy to grow up, with the hills to hike in and steep streets to coast on. Perhaps that's why I have such a warm feeling for Berkeley.

N: Yes, I was thinking as I came up to your house this morning that out of all the places that you've seen in the world, you have been faithful to Berkeley.

McL: My loyalty gets a bit strained these days by the antics of the Berkeley City Council--but we're still here.

Grant School in Oakland

N: Do you remember the name of the grammar school you went to when you were living in Oakland?

McL: Yes. It was the Grant School that was on Broadway at 29th Street on the N.E. corner. It was an easy walk from where we lived on Albion Street, across a little low hill. Of course, to a child it seemed a rather impressive hill, particularly with the several large mansions at the top. One of them was the Mollers. A daughter of that family--probably more than ten years older than I--was Lillian Gilbreth, part of whose remarkable story is told by a couple of her children in the book and movie, Cheaper By The Dozen. I didn't know them very well, but I remember being in the house a number of times when I was a little boy. On an adjacent street, called Summit, there was also a line of nice houses, in one of which one of my best boyhood friends, Edward Veitch, lived. And so I was up on that hill a good deal. Now, it's become "Pill Hill!" It's all completely transformed from an area of old mansions to the complex of hospitals and shops that it is today. I doubt if any of the old houses are left.

McKinley School in Berkeley

McL: After we moved to Berkeley early in 1903, I completed the fifth grade at the Grant School which required a long trip by the Telegraph Avenue trolley each school day.

The next term, I entered the McKinley School in the sixth grade. The old wooden building is still standing on Dwight Way. It meant walking across the campus from our house on Euclid Avenue on the north side which was a good bit of exercise. I remember a little boy asked me one time--this was way back in the '20s--where I had gone to school. When I told him the McKinley School he looked me over and said, "Gee, I didn't know Berkeley was that old!" I must have looked even more ancient than the old school then. [Laughter] I suppose that old building will be torn down pretty soon. It's not a school any more. I think it has recently been condemned.

N: Yes, although I think there are some classes still being held there--part of the Berkeley High School complex. But I always expect it to give a sigh and fall down.

The Old Anna Head School and Later Developments

McL: Yes, it was old when I went there. And I remember the Anna Head School also looked old when I was a little boy. [Laughter] It's still there, and it still looks old.

N: It's now the Institute of International Relations.

McL: Oh, they're in that? Rather a strange transition! I remember how unpopular I was with Mr. and Mrs. Daniel Dewey. This is an aside, but when I was on the Regents' Committee on Buildings and Grounds, it was decided that the University really would eventually have to have that land. Consequently, we didn't want the school to put a new and expensive set of buildings there. The Deweys were very much opposed to selling. As you know, it has since become a perfectly impossible neighborhood for a girls' school with Telegraph Avenue what it is today. It was a great piece of luck for them that the University bought it. Of course, the buildings were of rather little value, but the property was very good, and they received a fair settlement for it. We really did them a very good turn, but it wasn't appreciated at the time.

N: About what year was this, do you recall?

McL: It must have been in the late '50s. There was no pressure put on them to get up and leave in a hurry, but it had to be made clear to them that the school eventually had to move. I think at that time it was changed from a proprietary school to an institution with a Board of Trustees that could function more easily as a non-profit institution. This led to the erection of the attractive buildings on the site the school now occupies in the hills above East Oakland.

N: You may have forced an important decision at the right time.

McL: I think so. It's too bad they couldn't get some property in Berkeley to maintain the tradition. I think they looked at a number of places, including the old Garber house in the Claremont district. It would have been a fine place for the school. I don't know what blocked it. I suspect the neighbors. It's too bad we didn't keep the school in Berkeley, but it's got a good site and it's still an important institution. But I remember I was awfully unpopular with Mrs. Dewey at least! [Laughter]

N: I dare say they're reconciled by now.

McL: Oh, I think they might be. But of course they are not with the school any more. They built the new school, however, and got it well started at the other place.

N: He has even retired from the Berkeley City Council now.

McL: Yes, unfortunately. Well, they're very nice, friendly people.

N: It's interesting that you at least contributed a daughter to the Anna Head School.

McL: My daughter, Jeanie, is one of the few who started in the first grade in the old buildings and continued right through to the twelfth grade in the new school.

N: I see. Now is Anna Head's a day school, or a boarding school?

McL: It's entirely a day school now. It was originally a boarding school. It was a good thing to get the children out of the old wooden building, for the fire hazard was really serious. I feel less concerned about the Institute of International Relations!

The 1906 Earthquake

N: Right. Now, did I ask you whether you remembered your grandparents?

McL: Just my paternal grandmother; the other grandparents had died before I was around.

N: We had got past your grammar school. Now high school then would be next.

McL: I entered Berkeley High School in the autumn of 1905, when I was 13 years old, just to be there in time for April 18, 1906, which was the big earthquake. That earthquake fortunately happened, you know, about 5:15 in the morning. The massive chimneys of the old brick building fell right down on the two stairways of the high school. There would have been dozens of children killed if the earthquake had happened when the building was occupied. I remember great holes in the roof when we went down to see the school later that morning. The school was standing, of course, but the huge chimneys had come down directly on the stairways. The school was so badly damaged that for the rest of the term classes were held in various churches around town, and in other scattered rooms.

Mrs. Hearst was in Paris. Mother hired a car and drove down to Pleasanton to see what had happened to the Hacienda. The old house wasn't hurt very much. Some fireplaces had fallen out, and one or two of the big flower pots that lined the roofs had been knocked over. Fortunately they fell out and didn't break through the roof, so the house wasn't damaged very much.

But here in Berkeley, two of our chimneys were knocked off. The earthquake was really the strongest one I have ever experienced here or even in Peru. We watched San Francisco burn for three days. It must have been eight or nine in the morning when we first noticed a tremendous column of smoke rising above the city. It looked like the pictures in the old geography books of an eruption of Mt. Vesuvius.

N: Last days of Pompeii!

McL: Yes. A great cloud of billowing smoke--like a cumulus cloud.

N: Was it black smoke?

McL: No, it was white-ish; you see, condensation from the rising hot air made a great cloud, like a thunder head over the City. After the first day, the fire spread out and the smoke was everywhere. At night, the sight from Berkeley of the flames and the reflection in

McL: the sky and in the bay was really terrifying. The first night the fire was all behind Goat Island (Yerba Buena Island) as we saw it from north Berkeley. The island was silhouetted against great flames shooting up above it. The next night the fire from our angle was on both sides of the island. I think that was when the Fairmont Hotel burned. Then came still a third night of fire with flames still farther out.

There were a number of earthquake shocks--after-shocks--that kept us on edge. I remember one about eight o'clock the first morning that set our wooden houses rocking. Very few of our friends from San Francisco turned up on the first two days. They were driven by the fires to the other side of San Francisco and it wasn't until it was possible to get down to the ferries that a few came to us in Berkeley. A good many refugees from south of Market, however, escaped to Berkeley. Tents were put up on the campus for them. It was a dramatic time. I should have been more venturesome and gone to San Francisco, but it seemed better to stay home. [Laughter] Sightseers--especially fourteen-year-old boys--were not exactly wanted anyway. And fortunately there was no fire here.

N: You were speaking of the effects on the Berkeley High School building--was that located where Berkeley High is now?

McL: It's on the same corner as the present school. The old building was repaired and I continued in school there.

II WITH MRS. HEARST IN FRANCE AND ITALY

McL: Well, to go on with the story, Mrs. Hearst then cabled us to come over to France, to join her in October, which we did, crossing from New York to Cherbourg on the Hamburg-American liner, Amerika. We had a lovely time there. She had a very beautiful apartment on the Place de l'Alma, numero 1 bis.

N: Oh, yes. There's a bridge there.

McL: Yes - the Pont de l'Alma was one of the most graceful of the Paris bridges, but unfortunately, the arches were so low that they were a hazard in times of flood. So the old bridge has now been replaced by a single steel span wider and higher, but far less beautiful than the three stone arches that were torn down.

I was fascinated with an old hydraulic elevator in the building. It had a long shaft that pushed an ornate cage up and down very slowly. [Laughter] I was the only boy in the household, and I just couldn't be dragged around on shopping tours with the ladies who seemed very elderly to me. So I went off on my own and really explored Paris very thoroughly, riding up and down the river on the boats, and to the end of the Metro lines--the subway--as well as taking trips on the double-decked steam trams. I remember accidentally getting down to the Isle de la Cité and seeing Notre Dame for the first time without knowing where I was or what it was. I was very excited at having made this discovery! [Laughter] I explored Notre Dame from the top of the towers to the crypts. Then later I remember Mrs. Hearst officially taking me around to show me the sights and I'd seen practically everything already - and probably a bit more than the rather formal old ladies had ever seen!

So I really acquired a geographical sense of Paris that's always stayed with me. In fact I feel I know just where I am today in Paris.

N: Did you have any French at your command at this time?

McL: Not very much. I'd taken one high school course in French; my French

McL: was terrible, but enough to ask questions. My ability as a linguist is very poor anyway, but I've managed to get around. I found when I was back in Paris in the latter part of the war, my knowledge of the geography helped a good deal, though I had a lot of new things to learn at that later age! [Laughter]

In the late autumn, we visited Chartres and then drove through the chateau country in the Loire Valley in Mrs. Hearst's "Itala," an open touring car that in those days was the last word in elegance and speed too. Even though I was a rather young boy, the great cathedral and the gracious chateaux gave me a feeling for lovely structures that I think has stayed with me all my life. Even the excitement of driving in the Itala, which was a novel experience for a boy before automobiles were common, wasn't enough to make me forget the architecture we saw.

Dr. and Mrs. Joseph Marshall Flint--she was Mrs. Hearst's niece and a very lovely person--made the trip with us.

We then went to Italy for part of the winter, where we spent a month in a villa on the Island of Capri with the Richard Walton Tullys. Tully was a playwright. He wrote "The Girl of the Golden West," and a couple of other successful plays. His wife was Eleanor Gates, who wrote at least one fairly successful novel, though not a best seller. They were relatively young people, both of them Berkeley graduates, who started off in a very great way and then went over an early peak and didn't do much afterwards. I don't know just when they died. He had been the Yell Leader when he was on the Berkeley Campus.

N: In what part of Italy did you spend most of the time?

McL: Capri - near Naples. It is now a rather crowded resort. We had Elihu Vedder's villa. Elihu Vedder was an artist of great fame then, though perhaps scarcely remembered now. It was an interesting house, called the "Torre Quattro Vente." We spent about a month there. Then again on my own, I explored Capri from one end to the other, made friends with boatmen, poked into all the little grottos and had an exciting time. The island was perfectly fascinating to me. I haven't been back since. From the tales you hear, life on Capri today must be very different but it must still be a beautiful spot in spite of the multitude of visitors.

N: Yes. How did Mrs. Hearst know Mr. Tully and Eleanor Gates?

McL: I think she knew him when he was a young playwright, shorly after he graduated. She was always interested in young people, and here was a talented young fellow and his wife who deserved help. She really got them started on their careers.

N: I see. Was it during this period that she found the well-curbing?

McL: No, that was earlier. That must have gone back to the '90s. I don't know when she bought it, but the curbing was in the center of the patio at the Hacienda as far back as my memory goes.

III MRS. HEARST AND THE HACIENDA AT PLEASANTON

N: I hope you're going to talk some more about Mrs. Hearst and about the Hacienda, too.

McL: Yes, she was a very important person in my life and my memory of her is a very happy one.

Now with the burning down of the old place, you know, about six months ago, there aren't many relics of that chapter left.

N: It was called the "Hacienda del Pozo de Verona," is that right?

McL: Yes, "The House of the Well of Verona" named after the well-curbing she acquired in Italy and placed in the center of the patio at the Hacienda. It's a particularly graceful piece of carving. After her death, her son moved it to San Simeon where it now is. I don't know the date of the curbing, but I imagine it's something around the 15th Century. It was carved out of limestone--almost a marble. You can see it at San Simeon in the lower plaza on the southwest side. Really a lovely thing.

N: My little Spanish-English dictionary gave the definition of "pozo" as either "well" or "mine shaft". I thought mine shaft was very appropriate.

McL: Yes. Very. That's an interesting point--that is true. A mine shaft in Spain and Latin America is called a "pozo". Unfortunately, there was no mine shaft at the old Hacienda! Or even a well. There was no well in the patio--just the well-curbing. If you've been in Venice, you've seen that nearly every plaza has a somewhat similar curbing around a well. That's the way Venice got its fresh water. Some of the well-curbings have a little iron work above and a wheel, so that the buckets could more easily be lifted, but on this well-curbing now at San Simeon you can see the grooves around the side worn by chains as the buckets of water were pulled up. Look at that when you're at San Simeon next.

N: Yes, I will.

McL: Mrs. Hearst had her own flag station on the Southern Pacific railroad in the valley below the Hacienda. It was called, "Verona." And I noticed when I went by the other day that the road across Laguna Creek opposite the site of the old station is called, "Verona Road." So that name is still there.

Then when the Western Pacific railroad was built through the fields below the house, a station on that line was named "Hacienda". In my early years--that is, back when I was a little boy in school and high school--not many had automobiles and nearly everybody went down by train. It was a little bit awkward from Berkeley. I did that so often. You'd go down to First and Broadway in Oakland on the trolley and then take the train there that went through Hayward to Niles and up the Niles Canyon. The train would let you off at the flag station. On the weekends, at least in the first decade of the century there'd be half a dozen, if necessary, shiny carriages with beautiful horses, coachmen, footmen on them. You'd be driven at a lively trot up the road through the lower gates and up to the house on the hill. There were then only a few farms in the area.

N: How long did the train ride take?

McL: It was about an hour's ride--generally a little more than an hour. It was not then a main line, though I think that the railroad through Niles Canyon was the original line of the Central Pacific into Oakland. Most of the trains were locals stopping half a dozen times on the way down.

Party for the Class of 1914

McL: After the automobile became more common, however, most of the guests would go to Pleasanton on the train and then be driven by car from there. It didn't take much longer. Even in my college years, the automobile was gradually replacing the train.

When Mrs. Hearst gave a big party for my class in 1914, she engaged a private train, a long one--on the Western Pacific--that brought all the students, all the class, to the Hacienda station where there were cars and carriages to take them up to the house.

N: Was the fact that you were in the class part of the reason she gave the party?

McL: [Laughing] Well, perhaps! She had had parties before for classes, but this was a very special one. It was a very nice occasion.

N: How many were in your graduating class?

McL: I think about 600, and I don't know how many went down there. Probably most of them.

N: Imagine giving a party for 600 people! There's something very princely about it.

McL: Yes. It was. I had, of course, a lot to do with the arrangements and so on; getting things organized. There was a big circular tent over the patio supported by a great pole in the middle rising from the well-curbing. The tent spread over the driveway that was covered with a floor and circular table on which lunch was served. Everybody seemed to have a good time, especially a few who raided the wine cellar without attracting any attention. When the class held its 25th anniversary, most of the survivors and their families revisited the Hacienda which had then become the Castlewood Country Club. We had a pleasant party, but of course it was far from being on the scale of the one in our Commencement Week. Things had changed a great deal. It was a bit nostalgic, but everybody seemed to have a lively time. Unfortunately, one attractive girl, to whom I was being mildly attentive, brought me up to date by telling me that I was mistaking her for her mother. The Club didn't live up to its possibilities; it was rather messy, I thought, but they had at least added a fine swimming pool.

The House: Schweinfurth and Julia Morgan

N: Were those the original buildings?

McL: Yes, the central building was there, but they had made additions and modified it so much that most of the charm of the old house was lost. There were only a few little spots that seemed familiar. They did keep most of the patio. After the recent fire, all that is left of the house now is the front wall of the patio and the original gates. I presume they will soon be torn down. The rest of it is all burned. The big music room at the south end is still standing. That was a later addition by Mrs. Hearst. A rather unattractive house some distance away that was called "The Boys' House" is still there. These buildings were not part of the original design. The original design was by an architect named Schweinfurth. He did a number of good houses in Berkeley also. He did the original Unitarian Church, you know, on Bancroft Way. It was threatened with destruction to make room for some of the units of the Student Center, but fortunately, it escaped. Another of his buildings is the fraternity on the corner of LeConte and LeRoy--a clinker brick house with an arched bridge across the creek in the front of it. His original design of the hacienda was really very lovely. A central three story structure

McL: stood on the east side of a large patio that was enclosed by two low wings on the south and north and by a smooth wall on the front. The patio was bordered by pergolas supported by thick white columns. The central part of the house was topped with two small, squarish towers. The roofs were flat for the most part. There were large red terra-cotta pots on the corners for ferns and flowers and little palms. Flowers dripped down the walls from them.

N: Lovely. This was a U-shaped house, then, I take it?

McL: The house itself was U-shaped, and then the end of the U was completed by a blank wall with a coping of tiles that was pierced by a heavy gate flanked by two roundish towers. As you came up the road along a palm-lined driveway that curved with the contours of the slope, a sharp right-hand turn over a causeway led the road directly to the gates of the patio. The carriages went through the gates into the patio, and around a drive circling the Verona well-curbing.

It was really a very lovely entrance. The carriages all came to the front door inside the patio. At night the outside gates were closed--quite in the Spanish tradition.

The other side of the house had a series of three terraces with rather stubby, thick columns, again with successive rows of big earthenware pots with flowers rising from a big porch on the ground floor, from which there was a lovely view over the valley to Mt. Diablo. The view, of course, gradually disappeared as the trees grew up around the place.

The first room one entered from the front door was called the hall, but it was really a large living room with a big fireplace in the middle. Doors and windows opened to a broad porch on the valley side. A room called the library was on the right--a charming, smaller room. The dining room and kitchen were off to the left of the hall--that would be to the north. Beyond the library, a narrow hall called the lobby led to a billiard room, and then to a wing with bedrooms. The so-called lobby was lined with book cases. There was an early set of Dickens, illustrated by Cruikshank, and also a complete set of Punch that I found most entertaining and instructive. Also a set of Thackeray and Mark Twain, too; all of which helped me overcome my lack of courses in English and history.

In the opposite direction beyond the dining room was a long pantry leading to the kitchen and servants' quarters. There were three floors in the central house. To the north there was a separate house, also attached by a corridor with thick rather stubby columns and a tiled roof. Part of it was a tallish tower which

McL: was originally a water tank, and a lower house that eventually was made into a dwelling too. Then in the other direction, Mrs. Hearst had added a big music room. Julia Morgan came into the picture later and designed an addition to the music room that included a couple of handsome bedroom suites, one of which Mrs. Hearst occupied for a few years before her death. The music room and the Julia Morgan addition are still standing. It's mostly brick, and it didn't catch fire.

N: As you looked at the building itself, was it mostly stucco or brick?

McL: It was mostly stucco, white, with coping of red tile on the walls and with some completely tiled roofs; most of them just tiles on the top of the walls, the way an adobe building would have its walls protected by tiles with a flat roof behind it. That's the way the house was laid out. Here's a rough sketch of it.

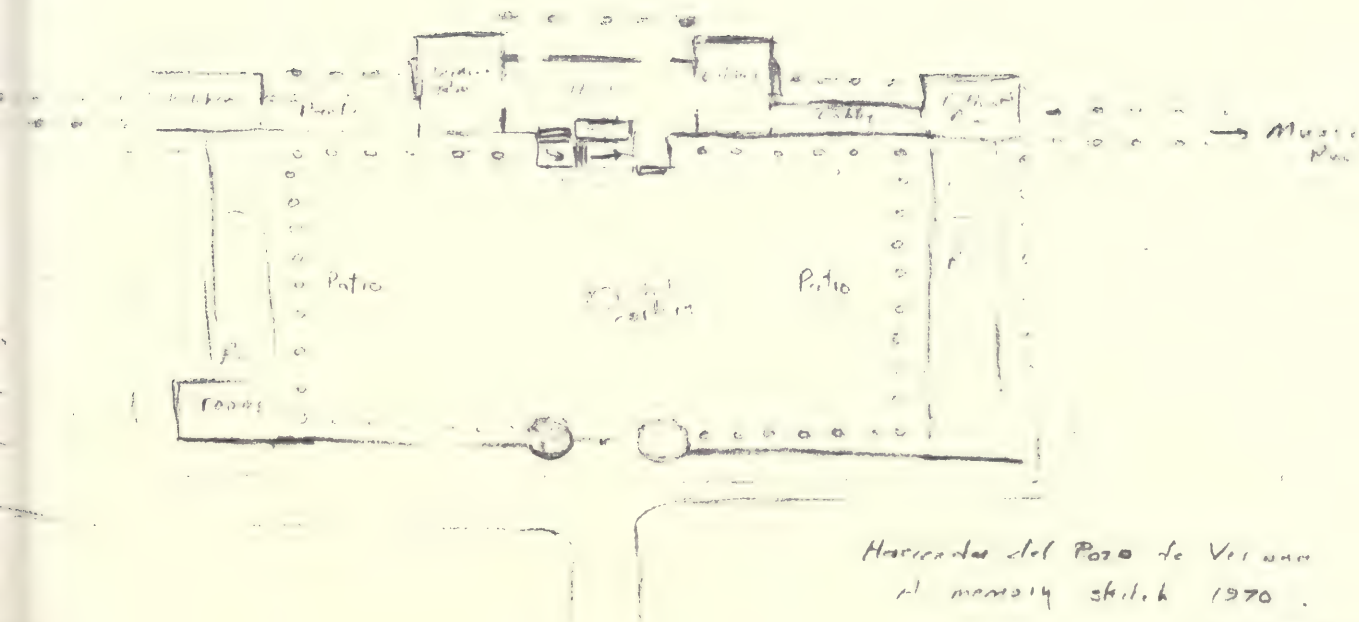
N: It sounds very welcoming.

McL: It really was. It was an extraordinary house and I think it would have been as well worth preserving as a state monument as San Simeon was later if it could have been taken just as it was at the time of her death. In her Will I think she specified the house and the land should be sold, and it was. I really don't know what the financial arrangements were, but it ended up as the Castlewood Country Club. It went through various vicissitudes, re-financing and so on, but the property has become immensely valuable because the club is now surrounded by an area of attractive country houses.

Lands, Water and Equipment

N: How much land surrounded the house itself?

McL: There I would have to check, but I think there must have been a thousand acres in the ranch, for it included some farm land in the valley below, as well as the steep, wooded slopes of the ridge to the west. At that end of the valley there was artesian water. Wells went down and hit deeper gravels in which the ground water was under pressure, held in tight by the overlying silts. There were a half dozen wells there that spouted water. That was of course an immensely valuable asset in California, and I rather imagine it was one reason why George Hearst was attracted to the property. Eventually the Spring Valley Water Company acquired the rights at that end of the Livermore Valley to provide water for San Francisco, but a very generous allotment of water was made to the Hearst Ranch in the deal, whatever it was.



Hacienda del Pozo de Vergara
el mezcal state 1970.

DH McL

Hacienda del Pozo de Verona
1936
(then Castlewood Club)

D. H. McLaughlin photo

McL: So, the ranch had a large quantity of water available. To pump it up the hill, a power-house was built, which is still standing though the building is a wreck now. It is on the road at the base of the hill. The building had a stack for an oil-fired boiler. The plant consisted of a one-cylinder steam engine that turned a dynamo to supply electricity and also pumped water up the hill. I don't know what became of the machinery. They would be museum pieces today. I don't think the machinery's there, but the old building is still standing.

N: This was really a self-contained little domain.

McL: It really was. It was something of a principality.

N: Right. "The Duchy of Pleasanton?"

McL: It was very much like that, and Mrs. Hearst presided over it in rather a royal way, you might say. [Laughter]

N. Something very engaging about the whole picture.

McL: Yes. Something that just couldn't exist now and was on its way out even then, I imagine. After all, she inherited a huge fortune from George Hearst who was one of the great mining men of the times. His record of acquiring major mines has never been matched. That was before the days of income tax, so the large income from the mines, which was largely left to her, made it possible to live in that way.

N: Did you ever meet George Hearst?

McL: No. He died the year I was born--1891. So I never met him.

N: Just sort of overlapped. Maybe there is such a thing as transmigration of spirit! [Laughter]

McL: He must have been really an amazing person. One of his earliest properties was a mine on the Comstock, which started the family fortune. He'd had some smaller mines on gold-bearing quartz veins before that in the Grass Valley and Nevada City region. He made some money out of them, but none became really important mines. The mine on the Comstock, the Ophir, in which he had a substantial share, made his first fortune; then he acquired for himself and his associate--J. B. Haggin in San Francisco--the Ontario Mine in Park City, Utah, which became a major silver and lead producer and a very successful venture indeed. It is still a producing mine. Unfortunately, his successors sold out before its full potential was recognized. Hearst and his associates were also the dominant people in the original Anaconda Mine at Butte Montana, out of which grew the Anaconda Copper Company. The Hearst-Haggin shares were sold seven years or so after Senator Hearst's death. And a little earlier than the Anaconda, he had gone to the Black Hills

McL: of South Dakota shortly after gold had been discovered near Deadwood and acquired a block of claims that covered most of the great Homestake ore body.

N: Oh, yes. We're going to go back to all of these. It's good to know about them.

McL: We're getting a little off the track perhaps!

N: It's all so fascinating, and we'll sort these things out as we go. Shall we go back a moment to Pleasanton? Was it a working ranch?

McL: Yes. But not anything of great importance. There were vegetable gardens down in the valley worked by skillful Chinese gardners; they supplied marvelous vegetables that I think were consumed entirely by the household. There was also a big vineyard with table grapes.

I don't think they sold any, but boxes and boxes of grapes were sent to Mrs. Hearst's friends. When I was a graduate student at Harvard, I had a box of grapes in sawdust sent to me nearly every week. [Laughter] In the autumn. They were lovely grapes, too.

N: Were any for wine?

McL: No they were table grapes - muscats and a great variety of dark and red grapes, all table grapes. Most of the rest of the land that was cultivated was just for hay.

N: Were there horses?

McL: Yes, there was an elaborate stable an eighth of a mile or so away away from the main house. It too was burned down - five or six years earlier than the recent fire. There must have been about eight or ten stalls for horses, maybe more, and a big carriage room. I've often thought what a museum that would be if it could have been just kept intact as it was. The carriages would now be hard to duplicate. They weren't used much after the automobile age arrived and I don't know what happened to them after her death. Nobody appreciated the value of things then that were to become antiques in a few decades.

Of course the time came even before Mrs. Hearst's death when nobody used carriages. She had several automobiles even as early as 1905. I remember one of the earliest was the Italian car called an "Itala," and then there was another car, the "Hotchkiss," an English car. They were all funny little cars by present standards and they would all be valuable horseless carriages today. [Laughter] I think the first car I ever drove was a "White Steamer," which she had somewhat later.

N: Is that different from a Stanley Steamer?

McL: Yes, but it was the same vintage. Somehow or other one hears very little about the White Steamer, and yet it was a standard car in those days; competed quite well with the gas cars. A very smooth-running thing, as I remember. That was the first car I ever drove or tried to drive.

N: That's a marvelous place to learn to drive.

McL: Yes, out in the country on the dirt roads or gravel roads.

N: How old were you, then, when you were beginning to drive?

McL: Let's see--I think that must have been in my high school days. I must have been about 16 or so, something like that. I don't think you had to have licenses in those days. Oh, I didn't do very much driving, but the chauffeurs showed me how to handle the car and let me run it once in a while which was a great thrill, of course. [Laughter]

N: Thinking again of the carriages--did they have two horses to pull them?

McL: Yes. There was one--a big tally-ho--that had four horses, but it was very seldom used. That was something of an occasion if it was ever brought out. Practically all the other carriages were for two horses.

N: Did Mrs. Hearst have any sort of insignia on the doors?

McL: Yes, her initials - PAH - in a rather elaborate monogram on the bridles and on the doors of the carriages. Some were closed, some were open.

N: How old were you when you first went there?

McL: I must have been eight or nine years old. There are some letters from me to Mrs. Hearst, thanking her for weekends at the Hacienda, in the collection of her papers in The Bancroft Library. I think the earliest is about 1900. Oh, I enjoyed it all so immensely. And then there were saddle horses. The chief recreation down there for youngsters was horseback riding, or hiking. There was a tennis court, but not much else in the way of sports. Two swimming pools were put in somewhat later. They would seem rather primitive by our present designs. The water in the first outdoor pool was extremely cold as you would expect artesian well water to be. Another pool later was practically part of the house. It was enclosed, kept heated, and more comfortable to swim in. I was never what you might call sports minded but I did particularly enjoy the riding.

N: I suspect that your learning to ride on the ranch helped you when

N: you were going up and down the Peruvian mountains later?

McL: Well, it did. I grew up very accustomed to riding. Riding over hills; there were some lovely rides to take there. If you know the place, there is a very abrupt ridge rising behind it, called "Pleasanton Ridge", which has a rather smooth, rolling top that gradually descends to the south, oh, in about four miles, down to Sunol. It made a lovely ride from Sunol to the top of the ridge, then a rather precipitous trail down to the house, about a thousand feet below. It's a nice walk today from Sunol up the ridge. You can walk for four or five miles in high country that is still empty. It's private cattle land, but I've never been put off. I've done it a few times with my daughter, Jean.

N: Oh, yes. This is her picture?

McL: Yes. She ought to be turning up very soon. She's a senior at Anna Head now but taking, in advanced placement, some courses on the campus. [U. C. Berkeley] She took a junior course last term--got an A in it too, a French course, and now she's taking two other courses on the campus. She's finishing an 8 o'clock and should be home pretty soon. Sylvia is away today, so I have the job of taking her to school. [Laughter] I think she's already admitted to Berkeley, but she hasn't made up her mind just what she wants to do. [Jean was later admitted to Stanford, but when Princeton accepted her application she decided to go there, both on account of the strong department of music in the University and the New School for Music nearby where she could continue her work on the piano.]

William Randolph Hearst

N: To return to the Hearsts for a moment, did you get to know William Randolph Hearst at all?

McL: Oh, yes. I knew him very well. He was a very good friend. I had little to do with him, however, in a business way. The Hearsts' stock in the Homestake Mining Company had been sold shortly after his mother's death so we had no association in that connection, though I was involved with him in the San Luis Mining Company and other properties that he controlled in Mexico. I had never had any connection with the newspapers or the magazines.

We're getting ahead of the story, but after he had inherited practically the whole of his mother's estate, most of the holdings in the mining companies that George Hearst had founded were sold with the exception of certain properties in Mexico. It's rather

McL: strange that I should find myself very much later in charge of the Homestake Mining Company after the Hearsts had been out of it for many years.

N: I wonder why they divested themselves of the mining interests?

McL: Probably because W. R. Hearst was much more concerned with his newspapers and other publications. He was still interested in mining, however, for he often talked to me about the mines in Mexico--but the papers were his first love. He wanted, I'm sure, all his financial strength concentrated in the newspapers and the publishing world. Of course, he made a tremendous record there!

N: Yes, and as a collector too. Did his mother start collecting early?

McL: He probably acquired the habit from his mother on their first trips to Europe. Of course he was a much greater collector than she was. Her collections were impressive but he really went at it professionally. He had a number of agents who were buying for him. His apartment in New York and the houses at San Simeon and Wyntoon were truly museums. He had warehouses filled with magnificent things, but most of the collections were sold off when he was in a bit of financial trouble in the thirties. It's a great shame, because it probably would have been the nucleus of one of the major museums of the country--if all the works of art that he'd collected had been kept together. There is a lot still to be seen at San Simeon, but most of the large collections in storage were sold, I believe.

N: Did he have any special interests--anything that he liked in particular? The collection is so diffuse at San Simeon it's hard to tell.

McL: Yes. There again, it's hard to say. I doubt if any one ever knew Mr. Hearst completely. He was a very complicated and talented person of many sides, many aspects. My impression of his taste is that he was more interested in architectural details, carvings in stone and wood, furniture, ceilings, candelabra and things of that sort, than he was in paintings. I don't think he ever had what might have been the nucleus of a great collection of paintings. He had many fine tapestries, some of which he inherited from his mother. He had a great feeling for medieval art that is revealed in the tapestries, the choir stalls, and the fine beds and furniture at San Simeon. It's really marvelous that way. Some contemporary things, of course were put in for comfort, which were nice to use, but did give the somewhat diffused feeling you mentioned.

N: Grandeur is a little difficult to live with.

McL: Yes [laughter] but I always enjoyed it when I was visiting there. I think I've slept in the Richelieu bed a number of times [laughter] without any ill effects! [Laughter]

N: How would you characterize Mrs. Hearst? The few biographies are so saccharine.

McL: You are right. They're not good.

N: Annie Laurie's, for example.

McL: Oh, that was a horrible book. I have a copy of it up here. She didn't know Mrs. Hearst very well, I really don't ever remember seeing her down at Pleasanton, though I suppose she may have been there. I don't seem to remember many of the people who were there casually, except those who for one reason or another impressed me particularly.

N: I want to ask you about them too. It's not possible that a woman who accomplished as much as Mrs. Hearst did could have been a little spun sugar character.

McL: No, she wasn't. She was a very dynamic, forthright little person, with very positive ideas. The life at the Hacienda was strangely formal and stiff in lots of ways. Never bothered me--I was doing just exactly what I wanted to do at that age. It seems strange now, riding horseback and swimming, and enjoying the luxury and the good things -- including the library--it seemed to satisfy me rather completely. I really didn't mind the formality in the least. Perhaps it is a sad commentary on my character that I accepted it all without worrying about its social implications that might seem disturbing to my contemporary liberal friends. But, the good things of life were there to be enjoyed--and I accepted them gratefully and uncritically and really had a happy time, without worrying too much whether or not I deserved it.

N: The life sounds delightful. When you say that it was formal, do you mean that the table service was formal?

McL: Oh yes. We always dressed for dinner. Even when there were only a few, perhaps no more than six at the table. Everything was very correct in the Victorian way. The dinners, in spite of their length, were entertaining because there were usually so many interesting people there that the talk was good - as well as the food. [Henry] Morse Stephens was a frequent guest. And other people from the Berkeley faculty were often invited. The Benjamin Ide Wheelers were there frequently, and it was a lively, interesting atmosphere. Cocktails were served only when it was a largish party, but not to the younger members. Three or even four excellent wines were generally served when it was a special occasion. It was all very strict, however, and I don't think anybody would ever be invited again if he--or particularly she--had one too many! [Laughter]

N: Well, she had her own standards, I'm sure. Did you have footmen behind each chair?

McL: Oh, no! It wasn't as royal as that! But there were generally at least two butlers.

N: It wasn't country living?

McL: It wasn't country living in the western American sense, but it had its country aspects with horseback riding and hiking in the hills. I remember with embarrassment one time at a rather formal luncheon in the big dining room--there were nearly always 20 people or 25 over the weekends--I felt something on my neck and flipped a wood-tick out on a serving plate! [Laughter] So it was a combination of country living as well, but...[laughter] after all, you couldn't escape woodticks and things of that sort in California in those days.

You were asking about Mrs. Hearst's own character. She must have been a very forceful person on the Regents, because I remember looking over some of the old minutes and seeing how President Wheeler would say, "Well, we must consult Mrs. Hearst about this." Or, "This would be subject to Mrs. Hearst's approval." So I rather imagine that she was a fairly dominant little lady on the Board. She was gentle, but by no means saccharine. She really was a very strict person, and everyone in her family had to follow a certain code of behavior that--well it seemed a normal code at the time, but it wouldn't fit in today very well! [Laughter]

N: Her son slipped the leash a bit, of course.

McL: Oh, yes, and perhaps that was...

N: Part of it?

Visitors and Residents at the Hacienda

McL: Family rebellions took place even in those days, but in her own house, there was no sign of it. There were a few other boys down there. One was Randolph Apperson, who died four or five years ago. He was her nephew. It's his son, Bill Apperson, now who's involved in this controversy with the Sierra Club about Apperson Ridge. Elbert Apperson, his [Randolph's] father, was Phoebe Hearst's brother. He lived at Sunol; the old house is still standing--a large wooden mansion with twelve foot ceilings, a cupola, wide porches and a lot of gingerbread. He had a ranch south of the Sunol Valley in the high country beyond San Antonio Creek which included what is now called Apperson Ridge; his

McL: grandson who owns it now is anxious to sell it to Utah Construction who want it as a source of basalt--hard rock useful for a number of purposes including Bay fill, which brings them into conflict with my wife Sylvia and the Save-the-Bay Association.

N: Yes. Do you have any views about this, just as a side issue?

McL: I do think that a large quarry there would be an awful eyesore, right at the edge of the Sunol Park. We do, however, have to get crushed rock from some source to meet the demands of our growing population for roads and structures. I don't feel as deeply as my wife does on this, for she is an ardent conservationist, but I would be sorry to see this lovely country turned into a quarry. The rock should be found some other place. At that, however, it would not be as bad as the Kaiser quarries, right here in the Berkeley hills, where they've made a hideous scar on a particularly fine ridge between Tilden Park and Round Top--just south of the Tunnel Road.

N: Yes, this really is one of the complicated problems of the time, isn't it?

NcL: Yes. There's not a great deal of good rock around here--crushed rock for all sorts of construction, concrete and things of that sort. But I'd be best pleased if they didn't put a quarry down there! [Laughter]

N: I quite sympathize. If we may turn back to Mrs. Hearst again, were there other young people in Mrs. Hearst's household--including a niece or a young girl?

McL: Yes, a good many--children or grandchildren of relatives or of old friends. One of them was a young fellow--William W. Murray--who was a cousin of Millicent Hearst--Mrs. William Randolph Hearst. He was a New York boy who came out here and Mrs. Hearst in her usual way of liking to help young boys, put him through college in Berkeley. He lived with us for several years while he was in college. After that, he held various positions in the San Francisco office of the Hearst estate for the rest of his active life. He was in charge there when he retired a few years ago. He lives over on Broadway Terrace in Oakland.

Other contemporaries of mine were Edward Clark, Jr. and Helen Clark. They were the son and daughter of Edward H. Clark, who became manager of Mrs. Hearst's affairs after the death of the Senator. They lived in New York, but spent most of their summers at the Hacienda or at Wyntoon on the McCloud River. They were both very close friends of mine. Helen, who married Howard Park during the war, died a few years ago. Eddy Clark, Jr., who later was a lieutenant with me in the 63rd Infantry in World War I, is living in San

McL: Francisco now. After graduating from Yale, he was with the American Trust Company-- now the Wells Fargo Bank--and also has a couple of entertaining books to his credit.

N: In one of the books there was a reference also to a young cousin, I think, of Mrs. Hearsts's.

McL: That was probably Edward Clark, Sr. In addition to managing the Hearst Estate for many years, he also became president of both the Homestake Mining Company and the Cerro de Pasco Copper Corporation for a time.

N: And then was there also a young woman?

McL: Oh yes, I seem to be forgetting them. There were two attractive young women down there, older than I, next generation up; 10 to 15 years older: a niece, Ann Apperson(Flint) and a cousin, Agnes Lane (Leonard). Agnes died several years ago. Ann Apperson married a doctor, Dr. Joseph Marshall Flint, who was then on the faculty of the San Francisco Medical School of the University of California. He eventually became a professor of surgery at the Yale Medical School. [Mrs. Flint died July 13, 1970] Another lovely girl who was often there, and was one of my very dear friends, was Harriet Bradford. She made a most interesting tape for the Phoebe Hearst Association about her life at the Hacienda. The Bancroft should have a copy. Does it?

N: No. You know, I tried to trace that and I didn't succeed.

McL: No, I'll tell you about that later. She was the daughter of a sea captain. He was always known as Captain Bradford, a handsome old boy. She was down there a great deal as a young girl. She was about my age. I don't know how they all met--it was an old friendship in San Francisco I think. Mrs. Hearst sent her to Bryn Mawr, where she did very well. Shortly after her graduation she served as Dean of Women for a while at Stanford. She then took a law degree at the University of Chicago, and ended up in a Boston law firm. She never married. We've kept up our friendship over the years; she died about a year or so ago, and in her will she left me a portrait of Ann Apperson that she particularly treasured for they were very close friends. It's out there in the hall now. It's rather nice, but not a great portrait.

N: But what a nice, sentimental thing to do.

McL: Yes. She was really a very wonderful person.

N: I'm so astonished at the way these names just pop out of your mind!

McL: Well, it is funny how you recall all these things. There's a little

McL: lady up in Chico--Mrs. Vonnie Eastham--who became very much interested in Phoebe Hearst's history. She has more or less made a full time job of it.

N: I think Mr. Kantor of the Archives told me about her.

McL: She is not a professional historian, but she's devoting a lot of time to investigating Mrs. Hearst's career and getting in touch with the people in Missouri, where Mrs. Hearst came from. They've organized a Phoebe Hearst Society there, and they have the schoolhouse, in which Phoebe Hearst taught, preserved as a relic in Missouri. She's been active in trying to accumulate records (tapes, that is) of this sort. She has a very good one from Harriet Bradford, which Harriet sent me--to be returned after I had listened to it. It now is in the hands of this lady, or of The Society. She's a very nice little person. I think Eddie Clark also made a record for her. I was asked to, but never did get around to it. Eddie married Peggy Nichols, the daughter of Bishop Nichols who was the Episcopalian bishop here. I was best man at their wedding. This was back in 1917 shortly before we were commissioned lieutenants. They're divorced now, unfortunately.

But this little lady up at Chico has been very active. She doesn't have a lot of academic credentials, and The Bancroft Library perhaps hasn't taken her as seriously as she thinks she should be taken. She wanted to work down here in the records and I am afraid they may have brushed her off a bit.

N: Did they hurt her feelings?

McL: Maybe. Harriet Bradford, I think, sent her all her correspondence with Mrs. Hearst and Mrs. Flint. Mrs. Eastham didn't seem too enthusiastic when I suggested that the Harriet Bradford letters should go to The Bancroft Library.

N: So she has the letters! [Laughter]

McL: I think so unless they have been sent to the Phoebe Apperson Hearst Society in Missouri. I was terribly afraid at one time that she might persuade W. R. Hearst, Jr. to let her have some letters from the files he had. But fortunately all those archives are definitely in The Bancroft and they, of course, contain the important letters. All the letters of Phoebe Hearst herself, which were stored at San Simeon, now are in The Bancroft. This little organization in Missouri--worthy as it is--is hardly the place for the documents that might become of considerable interest to California historians. But I think The Bancroft Library had better cultivate her.

N: I think you have a very good point. We'll have to tip off Bancroft,

N: especially if she is in possession of some good letters.

McL: Well, she has the Harriet Bradford letters. The Phoebe Hearst Society in Missouri is a little group of devoted people, but I think they are more interested in Phoebe's early years and her contribution to the Parent-Teachers Association than in her life in California.

N: That's very interesting--you have to be wary of your friends. Did you ever discuss politics at the Hacienda or hear Mrs. Hearst give her views on this sort of thing?

McL: Yes, well, with the people who were down there. There were frequently distinguished people coming in from Washington. It was really in many ways an important center of life on the Coast, for many people of importance were invited and entertained. The [Herbert] Hoovers were there quite often. At that time, he had already become a successful and outstanding mining engineer. He must have still been in his late thirties when I met him first down there, I was just a freshman in the College of Mining. He had a great interest in young people, even then, and talked to me a lot about mining careers and how one got started. I was tremendously flattered that anybody of his distinction as a mining man would spend so much time with a youngster. Then I didn't see very much of him after those early years.

In fact I had nothing to do with his Belgian relief work and did not have any opportunity to see him during the years he was President. After he was out of the White House, however, there were quite a number of occasions when I was with him. He recalled the visits he had made to the Hacienda and even remembered me as a boy. He was always cordial and sent me copies of several of his books. He rarely missed being at the Bohemian Grove during the summer encampment and I made a point each year to call on him at his camp for he always seemed interested in talking about old mining experiences, as well as current activities in his field.

N: Was he a gold and copper man as you turned out to be?

McL: He was into pretty nearly everything. On one of his early jobs in Australia, in Western Australia, he had charge of a mine called the "Sons of Gwalia" which was a successful gold mine. When I was in Western Australia in 1935, I happened to ask an old timer if he had known Mr. Hoover. He replied: "Oh, yes, but I thought he was a bit of a wowser, you know." It didn't quite seem in character to me until I learned the "wowser" in Australian slang was a type that avoided the pubs on Saturday night.

Hoover was associated with a London group that was concerned

McL: with development and operation of a wide range of mines. His activities with them and other connections took him all over the world. That led to his being in England in 1914 when the war broke out. He played a big part in getting the Americans home who were stranded without ready funds. That was really his first war activity. Soon after, he organized the Committee for the Relief of Belgium, which functioned under his direction until we went into the war when he became food administrator for President Wilson. That's the way he left mining.*

---

*See Obituary of Herbert Hoover by DHMcL - Bulletin, Mining and Metallurgical Society of America, 321, December, 1964.

IV THE UNIVERSITY OF CALIFORNIA: MINING, GEOLOGY, AND CAMPUS PLANS

N: How did you determine that you were going to Cal, to the University at Berkeley?

McL: Well, living in Berkeley and spending a good part of my time as I did at the Hacienda in Phoebe Hearst's household, I heard a lot about the University. It became a very clear objective to me to meet its requirements and enroll as a student. Indeed, at the time, I doubt if I considered any other alternative, exept to go to college in Berkeley. Mining was, of course, very much in the background at the Hacienda. In those days the manager (who was then called the Superintendent) of the Homestake Mine was T. J. Grier. He and his family often visited at the Hacienda. I became very good friends with all of them. I did go up to Lead in the Black Hills in one of my summer vacations, and worked in the cyanide plant for a while. Previous to that I had worked for part of the summer of 1912 in the Central Cyanide Plant of the North Star Mine which was then one of the major mines in the Grass Valley district (California). In those days, Grass Valley and Nevada City nearby were primarily mining towns--quaint perhaps in retrospect, but then a bit primitive. The Holbrooke House was the only hotel, but I soon found a pleasant room in a private house. Bathing facilities were limited, but that seemed unimportant then. There were some good parties at the Footes--he was manager of the North Star and in the Bourne mansion--and at the Starrs at the Empire Mine, which was then in its most prosperous period. All in all, my memory of the summer there is decidedly pleasant. It's a fragrant country with pine and oaks of the lower forest zone of the Sierra Nevada and a distinctive country of red soil, canyons and streams that one never forgets. And I can still smell the strange, rather subtle odor of the cyanide plant. So that more or less started my interest--though I am afraid it turned me away from metallurgy and toward geology.

Mrs. Hearst had given the University the mining building, which is still one of the best pieces of architecture on the campus. I knew Dean S. B. Christy well and mining seemed a good field to go

McL: into. Mining engineering was quite a glamorous profession in those days. It is much less popular now and as a separate curriculum it has practically died on the vine in the University and in most other places as well. But in those days, it was one of the glamour fields, and it seemed rather a natural thing to go into. Especially in the handsome new Hearst building. So that's the way I started in mining. Though of course even in the mining curriculum, as it was in those days, the first three years were mostly devoted to mathematics, physics, chemistry, geology and general engineering. The mining aspects of it you really didn't get into until your senior year.

By that time I had rather drifted away from the mining engineering and into geology. I took some courses under Andy Lawson [Andrew C. Lawson], who was a great teacher, and George Louderback, so I think my interests rather strayed from mining as it was taught then. As I said, [Samuel B.] Christy was Dean, and quite an extraordinary old boy, but it seemed to me that my future was not in the things he was teaching, but in the utilization of geology in the search for ore.

N: Did you have an idea that you were going to be interested in geology or mining when you went to the University as an undergraduate?

McL: I had an idea that I would be interested in mining, but that probably was influenced by some of the people I saw at Phoebe Hearst's house and by the fact that her fortune--and very delightful way of life--had been made possible by the success George Hearst had in mining. I had seen some of the operations that were the base of that fortune. And then with the construction of the fine new mining building it seemed rather an appropriate thing to go into that field. Furthermore, exploration, particularly in mountainous country, had always excited me and geology and the search for new mineral deposits offered a pattern of work that fitted in very well with my early enthusiasms.

An Interest in Geology

McL: My interest in geology came in the course of my undergraduate work in Berkeley. I rather drifted away from what was called mining engineering as it was taught in those days, a good deal of which was really trade-school stuff, and into geology. I debated for a while whether or not I would go into chemistry or geology in my junior year, but I finished the mining curriculum, though I did as much work as I could in geology. When I went on to graduate work in geology at Harvard, I found that my engineering training was very

McL: good preparation, for it had provided me with the mathematics, physics, and chemistry I needed for advanced work.

N: Were there any professors on this campus that you remember as being influential or exciting to you?

McL: I remember in the engineering field taking theoretical mechanics with Professor LeConte, the son of the geologist, generally called, "Little Joe." [Laughter] He was a very good teacher, and it was a very good course. I think he was one of the outstanding teachers I had. In mathematics I had the good luck to have Baldwin M. Woods as my instructor in the calculus. As you know, he later became a vice-president and my friendship with him was renewed when I returned as a dean and later as a Regent.

N: What was it that Little Joe LeConte taught you?

McL: Theoretical mechanics.

N: Have these areas changed over the years or are these the conventional courses?

McL: Many changes in emphasis but there's a lot of basic material that stays the same. The methods of teaching, the manner of presenting even some of the rather static concepts have changed a lot, however.

N: Were there colleagues or fellow students who were memorable to you?

McL: Yes. There were several boys in the class who became very successful in mining work, though I haven't seen many of them. One of them was Jack Abrams, who was a football man too. He became manager of the great Climax Molybdenum Mine in Colorado and made a fine record in mining. He died some years ago. I should say as a mine operator he had the most distinguished record in the class. He went into straight mining, really did a great job.

N: About how large were the classes?

McL: Oh, quite small. I think the graduating senior class in mining engineering wasn't more than 25 or 30. The old-fashioned education in mining engineering was already beginning to decline even then. It was a fascinating field at one time for it was linked with exploration and development of new properties all around the world. Hoover was the type of man who had risen to success in it, and Berkeley graduates like Will Mein, Charles Merrill, Ed Oliver and Butters, who were metallurgists and inventors. We have a brilliant lot of mining engineers and managers among our alumni though we can't claim Hoover. Gardner Williams, who developed the Kimberly diamond mines in South Africa was one of them and another was Stanly Easton who for years ran the big

McL: Bunker Hill and Sullivan Company in the Coeur d'Alene district in Idaho. Members of the Bradley family and Stuart Rawlings were among those who had distinguished careers in mining and all were graduates in mining engineering. Mining was a very glamorous field then.

Changes in the Curriculum

McL: But gradually as engineering became more and more technical, more and more exacting, the old mining curriculum almost seemed to have become something of a trade-school type of training and it just withered away. It was a separate college, you know, until 1942, separate from the College of Engineering. When Bob Sproul persuaded me to leave Harvard and come here in 1941 after Dean Probert's death--he was Dean of the College of Mining--the plan was to put the courses of the College of Mining into the College of Engineering and continue then as a Department. The understanding was that I would be Dean of Engineering and Chairman of the Department, which I did become.

There was so much sentiment about the Mining College on the part of old graduates that there was a lot of opposition to merging it with Engineering, but it was the right thing to do. Enrollment had declined seriously and now mining engineering--in name at least--has disappeared even as a department. That's true today in most other universities too. So many had mining colleges at one time. It isn't that the mining industry has declined--it's greater than ever, far greater than ever--but it draws from all other fields of engineering, plus geology.

N: Does it require more specialized teams?

McL: In a sense, less attention to some of the old, so-called practical things that can be learned better in the field than in the university. It needs men with broader basic knowledge as well as more exacting training in some specialized fields. A great many people now go into mining through geology. You can prepare for a career in mining through mechanical engineering, or go into jobs in the mining industry through civil engineering. There's been a vast change in the approach toward training men for the field.

N: Sounds much more sophisticated.

McL: Oh, it is. Much more. It doesn't mean we're not in great need of skilled professionals. We don't need fewer, now we need many more very ably trained engineers for the mining industry than ever before,

McL: but it's not confined to men with the old, restricted mining school type of education.

N: Does it require a broader theoretical background?

McL: Yes, a broader engineering background. There are some schools: the Colorado School of Mines, and the Montana School of Mines, and the Michigan--they call it Institute of Technology I think, now--which are outgrowths of mining schools per se, but they've all developed into rather broad, technical schools--South Dakota School of Mines also. They've become technical schools, rather than strictly mining schools.

N: Did you have the impression that Mrs. Hearst had a greater interest, perhaps in, let's say, the Mining School than in other aspects of the University?

McL: No, I don't think so. Her desire was to build the mining building as a memorial and a tribute to her husband, who was one of the great mining men of the world, though he was not a technically trained man at all. He was an extraordinary explorer and developer of mines, and had a great sense of what were good mines and what were not.

N: Do you want to go on with the mining now, or should we go back and get you out of school?

McL: Well, my years in Berkeley as an undergraduate were very unusual because I was spending practically every weekend down at Pleasanton. That made it necessary to study very hard during the five days during the week, which forced me to develop habits of intense work that have been helpful all my life. This happened because I didn't want to do any work on the weekends. So, to indulge myself in this way, I had to learn how to concentrate on what I was doing when I was in Berkeley. I really enjoyed this pattern of life, but it did keep me out of many collegiate activities. Consequently I wasn't too well acquainted with my class.

Scholastic Honors

N: I might list some of the activities that were noted next to your name--or perhaps these are mostly honor societies. Maybe you can tell me what they are. Of course we know what Phi Beta Kappa is, and I see you wear your key.

McL: Yes. I was Phi Beta Kappa in my junior year.

N: That's really impressive--I know not many are.

McL: Henry Breck, Ralph Wadsworth and Clotilde Grunsky (Taylor) were among the six juniors elected to Phi Beta Kappa in 1913. Clotilde was medallist of the class in 1914, and Ralph Wadsworth in Civil Engineering and I received honorable mention. Unfortunately, no gold emblem accompanied the honor.

N: And then there was Sigma Xi....

McL: Sigma Xi is a scientific society, more or less the equivalent of Phi Beta Kappa except that it emphasizes research in science. In those days Sigma Xi let in some undergraduates.

N: Were you an undergraduate when you went into it?

McL: Yes. Now Sigma Xi has become really a graduate school honor society and I think admission now depends upon research. I certainly had not done anything that warranted my admission to Sigma Xi, but they let seniors with good grades in.

N: Well you've made up for it since. You've made it retroactive. [Laughter] Tau Beta Pi?

McL: That's an engineering honorary society, more or less the Phi Beta Kappa of the engineering group.

N: And what is Theta Tau?

McL: A local, western fraternity. Something of an honor fraternity in geology and mining engineering. They had a very active chapter here when I was in college, and I found it a very pleasant organization. It's somewhat more social that the other societies here, I think.

Kappa Sigma is a social fraternity. I didn't join Kappa Sigma until my senior year, because I was not interested in fraternities at all. But a couple of rather close friends were in Kappa Sigma and they finally persuaded me to join the fraternity in my senior year.

N: If you were at Pleasanton every weekend you really didn't have much time for it, did you?

McL: No, I didn't really feel I wanted to be a member of a fraternity, but I've enjoyed very much being a member of Kappa Sigma. They've been very nice to me. They have a fine new house here now. I am invited over once in a while, to talk to the boys, and once even to serve on a committee to select the Kappa Sigma queen for some event--a very pleasant assignment. It's one more opportunity to

McL: have some association with the undergraduates today.

N: It's still operating?

McL: Yes. They did have that attractive Georgian house on Piedmont Avenue opposite the stadium. It had been built on land leased from the University when the chapter outgrew the old house on Ridge Road. Unfortunately, the University thought it had to use the property and took it over while I was Chairman of Buildings and Grounds for the Regents. [Laughter] I was very unpopular. Clark Kerr's also a member of Kappa Sigma, and we were both in wrong with our fraternity over this. They then built a house up on Warring Street, quite a handsome house, and it's still an active and successful fraternity.

N: That's interesting. So many of them weren't able to adjust to the new ways.

McL: Quite a few got into difficulties. They gave me the honor of being Kappa Sigma Man of the Year about ten years ago, which was very nice of them. It's a national fraternity, with its greatest strength in the South.

N: Yes. Phi Lambda Upsilon?

McL: That was a chemical honorary society; I really never had very much to do with it.

N: You just sort of harvested everything good that came along.

McL: I liked chemistry very much; glad I didn't go into it, though. [Laughter]

N: Scabbard and Blade was R.O.T.C., was it?

McL: Yes. It wasn't called R.O.T.C. then. It was the University Cadet Corps. R.O.T.C.--Reserve Officer Training Corps--came later. I don't know when it came in. Scabbard and Blade is the officer's society. I was a captain in the Cadet Corps.

N: I see. And then I have something about Chi Epsilon; is that something quite different?

McL: It is an engineering group, I think, that I was asked to join when I was a Dean.

N: Right. I did want to mention the fact that you were Mining Association Treasurer and President.

McL: Oh yes. The organization of the student body in the Mining College was called the Mining Association. I was an officer of that.

Geology and Field Work

McL: After I graduated from Berkeley Mrs. Hearst just said "Well now, I want you to go on to Harvard, do what ever you want in graduate work." So I decided I'd like to go on into geology at Harvard. Andy Lawson, I remember, recommended Harvard, especially to work with R. A. Daly. He regarded Daly as one of the outstanding geologists of the times, which he was.

Reginald Daly was a Canadian who became a Professor at Harvard in his early years. I took a number of courses with him and was an assistant for two years in his famous introductory course Geology 4. We became very good friends then and later when I was on the faculty. I didn't, however, do my principal work for my doctorate under him, but under Louis C. Graton, who was professor of economic geology. That's more or less the way I drifted into geology. In those days you had to do a lot of field work in geology here in Berkeley -- and it is still emphasized. Lawson taught the class in field geology in the Berkeley Hills then. It was fine training.

N: What would you do? You would go out into the hills?

McL: Yes, every Saturday in the Junior year. It interrupted my weekends at the Hacienda, but in spite of that, I liked it -- which may indicate that my interest in geology was pretty serious, even at that time. We'd go out in a group of about, oh, perhaps, fifteen, and map the geology of the hills. Lawson would just turn us loose up there, but on a tight time schedule. Then he'd check over what we'd put down, say something sarcastic, and send us back to straighten out our errors. [Laughter]

Lawson was really a most cultivated person as well as an outstanding scientist, but he concealed his charm, except possibly to young women, under a cloak of rudeness. He was a first-rate teacher, as well as something of a campus character. His shock treatment of students kept everyone alert and did not lessen the persistent loyalty of those who studied under his direction, among whom were many who became distinguished geologists.

N: I thought when you were describing how the artesian wells operated in the Pleasanton Valley, a geologist would explain it that way -- it was very clear. But you were explaining the various kinds of materials.

McL: Yes. The wells tap water under pressure in sands or gravels held in by the tight silts above. That particular artesian basin is especially interesting geologically. The gravels there catch the flood waters that come down from the Mt. Hamilton Range through the

McL: Livermore Valley. The various streams unite in Alameda Creek that flows out to the Bay through Niles Canyon. So, in rather recent times, geologically speaking, the ridges that Niles Canyon cuts through, have been uplifted on a series of faults and the water-bearing gravels of the valley to the east were depressed in a basin, the bottom of which is below the lip of solid rock in the Canyon. It's a very special geological setup. The water in these gravels was a very important part of the supply for San Francisco. That was why the Water Temple was built by the Spring Valley Water Company in the Sunol Valley. The Spring Valley Water Company that was taken over by the City of San Francisco owned great areas of land down there, most of which is still held by the City. Now, however, most of the water that pours through the Temple probably comes from the Calaveras Reservoir or even from Hetch Hetchy.

V A REGENT'S PERSPECTIVE

N: Thinking of the campus again, do you remember being present at the laying of the cornerstone of the Hearst Mining Building?

McL: Yes, I was. I remember it was a very rainy day, and President Wheeler was there in his usual cloak. [Laughter] He wore a peculiar sort of a coat with a cloak over his shoulders--part of the coat, I think it was. There's a very interesting report on the ceremony by a reporter named Jack London. It was published in the San Francisco Examiner and there's a framed copy of it in the Mining Building. In the principal illustration there's a little boy in the background in these tight-knee pants that we used to wear. It may be me, but I'm not sure of it. I do know my mother and I were there. I don't remember a great deal about the ceremony except that it rained dreadfully, and everybody was standing around under umbrellas. The speeches didn't make a lasting impression on me, but Jack London commented on them, more or less favorably.

Campus Architecture at U. C. Berkeley

N: Was the mining building then part of the architectural plan that Mrs. Hearst had had developed?

McL: Yes, the architectural plan as revised by John Galen Howard. The original Benard Plan that won the competition was really impossible. It was Beaux Arts - French - grandiose buildings that would have been utterly impractical today. Then John Galen Howard, who, I think, was runner-up in the big contest, was appointed the University architect and asked to revise the Benard Plan. He made it into his own which was really an improvement and much better adjusted to the terrain.

He retained the major axis that was an important part of the formal Benard Plan. A monumental building was to stand at the upper end of the axis where the Virus Laboratory is now. Then, on either

McL: side, down what used to be called the Botanical Glade, was to be a series of great buildings. The Mining Building on the north side of the axis near its upper end was the first one of the buildings located in accordance with the Howard Plan. Then later, you see, the library was built on the other side -- farther west on the south side of the axis. There was a cross-axis through the Campanile. A great building on Observatory Hill was to face and balance the University Library.

The plan had grandeur with proper order and formality, but still preserved the natural features of the campus. It's a shame more wasn't completed before the architectural blight of the last few decades descended on us. The major features of the Howard Plan were unfortunately disregarded rather frequently in the thirties and early forties.

Howard laid out an axis that was not parallel to the streets of Berkeley. You notice our buildings are slightly askew. I think the idea was to have a view of the Golden Gate right down the main concourse. Even that pattern was abandoned later when the Hearst Gymnasium was placed parallel to Bancroft Way. That was the handsome Women's Gym that Maybeck and Julia Morgan designed. From that time on, the old axis concept was apt to be neglected.

The Mining Building, the Doe Library, California Hall and the Campanile, and Wheeler Hall, and Boalt Hall, too - the little, old Boalt Hall, now Durant Hall - were all part of the Howard Plan. And I presume the big Life Sciences Building, the [George W.] Kelham building, which came later and which is certainly one of our major buildings at least in size, was located properly in relation to the Howard Plan - though it is rather a strange departure from the prevailing style. I'm not sure, but I think Kelham was the University Architect at that time.

N: Do you know why this grand axis scheme was not adhered to?

McL: I don't think it was ever formally abandoned, but there was a period of much less interest in the architecture of the campus. The University's great objective during Bob Sproul's administration was the creation of a truly great faculty. That I think is the greatest of President Sproul's many achievements. I don't believe that he was as deeply interested in the architectural aspects of the campus as some of his predecessors. In fact, Bob once admitted to as much when I was sounding off about some new structure I didn't like and he said, "Perhaps the campus architecture hasn't improved under my presidency, come to think of it!" [Laughter] It was in response to a comment of mine that a certain building looked like a shoe box with a cardboard lid. Architecture wasn't his major interest. He made the University the outstanding institution that it became under

McL: his presidency by recruiting great scholars and scientists. Some buildings, however, were not placed too well. And a few were located in a rather hit-or-miss way. Then the Second World War came along, and we had all those horrible, presumably temporary, structures cluttering up some of the best spaces on the campus. The Virus Laboratory was put where the great monumental building was to be, at the upper end of the axis. It was well designed for the purpose, but it is hardly a handsome building--though I am sure Michael Goodman, the architect, could have done better if he had had a freer hand. Architecture received new attention in the late fifties and early sixties, perhaps--but the period of truly grand structures, I am afraid, has passed. I trust, however, there is no decreased emphasis on the need to keep the faculty distinguished.

Committee for a New Plan

McL: To go on with this architectural situation--when I was on the Board of Regents during Clark Kerr's administration, it was recognized that the campus plan was really getting quite out of hand and a special committee was appointed consisting of the President, Bill Wurster and myself, to try to develop a new architectural plan for the University, of course with good technical assistance from Dean Wurster, Louis De Monte, and others of the campus office of Buildings and Grounds. We met regularly, nearly every week throughout an entire semester. Our sessions generally lasted for a couple of hours in the late afternoon. We really had a most interesting time.

A lot of attention was given to an effort to get the various disciplines properly distributed around the campus, so we didn't have part of biology at one end and something else in biology way at the other end. The present plan was worked up at that time, with engineering settled where it is, with room for expansion to the north; with chemistry and physics properly located close together. Economics and some of the other so-called social sciences were placed on the south side, centered around South Hall, and where Barrows Hall was to be built, and so on. There was recognition of the need to group the various disciplines conveniently with respect to related fields, and particularly to the University Library in the case of those most dependent on it. The area for the Student Union was designated and made a part of the group that was to include the new auditorium. The plan that emerged was adopted by the Regents, and so far, it has been followed without very many modifications. The principal change was the Moffitt Undergraduate Library, which was an awfully difficult thing to place so that it would be central and at the same time would not disturb the general layout.

N: Were you involved in the placement of that undergrad library?

McL: Yes. Our general concept then was to preserve the sylvan areas of the campus: Faculty Glade, and both branches of Strawberry Creek, and at the same time have certain residual axes of formality, such as the Campanile north-south axis running toward the engineering buildings. It was realized, though, that the old concept of a great axis, down the Botanical Glade, just probably would have to be abandoned. So it was eventually agreed to put a new building for mathematics on the west side of the mining circle, which was right across the axis, you see.

The old axis would have been open from the Oxford Street entrance to a monumental building at the high east end. That concept was more or less formally abandoned, and Evans Hall in its location west of the circle emphasizes the sad change. It finally grew under pressure into a huge building that will be painfully intrusive, I am afraid. It is, however, pushed back enough to the east so that it does not interfere with the view along the axis extending north from the Campanile toward the engineering complex. Unfortunately, when finally designed, Evans Hall was much higher and larger than we had originally expected the building on this site would be.

Then, too, it was decided the University would acquire a large part of the land as far south as Dwight Way, with the exception of the business districts and things of that sort, and some of the major buildings there. The piece-meal acquisition of that land was started, which created the situation that was exploited in the senseless "People's Park" controversy. The University was following a well considered policy of buying and getting the land it was going to need, before it became covered with big apartment buildings that would be very costly to acquire - perhaps prohibitively costly even by condemnation.

N: So the University did not really start out with a large enough piece of land, as some other Universities have been lucky enough to do?

McL: Well, it's a little bit ironic. The original property of the College of California did go as far south as Dwight Way. Most of that land, unfortunately was sold to get money that went into some of the original buildings. Sold for what would seem a pittance today, of course. Now the University is buying part of it back again. A great deal of the area has now been acquired. The dormitories, or residence halls, as they are officially called, were placed in blocks in that area. Then the old Anna Head School was told they had to move, as I have already noted.

N: It's curious how these things work out. When you were named to the Committee with Mr. Wurster and President Kerr, you were on the Board of Regents, weren't you?

McL: Yes. I have the dates that the committee worked in 1963. It was a

McL: very happy and interesting experience--three close friends working on something that they were all deeply interested in. Bill Wurster, who is a very good friend of mine, recognized that I didn't see eye-to-eye with him about the current styles in architecture, but he felt that we really got along very well in working out this general plan.

Some Personal Views on Campus Buildings

N: This is a little digression, but was the Environmental Design building more according to his preferences?

McL: Oh, I think so. That came later, though the site was approved in the new plan. I was rather hopeful that there would be a much more balanced treatment of that last fine open space there. Bill Wurster doesn't like formality. He likes the less formal arrangements. But he did not design Wurster Hall; that was done by a group in the Department of Architecture. The interior, in particular, might be regarded as a fine example of the brutal style of contemporary architecture.

The worst thing that happened architecturally on the campus in my judgment was Barrows Hall. That is just inexcusable. I blame the architects very much for siting that building where it is. It completely wrecked one of the few great views in the East Bay, which was of the Campanile as one looked north up Telegraph Avenue coming from Oakland. The way Barrows Hall would block this vista wasn't recognized until Tommy Church had been engaged as the campus landscape architect. He and I urged that the building be put on a different site or made lower so that the view would not be wrecked, but once you get something in the mill, it's almost impossible to move or change it. The building itself is pretty bleak. The red in the penthouse, which relieves it a bit, was a concession to me when I couldn't get it made lower and covered with a tiled roof.

The damage to the view of the Campanile was tragic -- and the architects didn't notice it. They should be more aware of things like that. By the time some models were made -- Tommy Church did that -- and we looked at those models, we realized what a great eyesore it was going to be. It was impossible to get it lowered or pushed back then. There was an understandable concern about intruding into the playing field to the south, but other ways could have been found to meet the problem.

A good architect could have taken the bulk that was specified and broken it up in ways that would have been much less offensive. An example of what a really great architect did with a very difficult

McL: task, was Gardner Dailey's treatment of Tolman Hall. He came to us first with just a rectangular mass to show what the space requirements would mean if you put it all in a rectangular building. The size was appalling. Then he went to work and broke it up into smaller units, worked in the handsome open walkway and made a very attractive assemblage out of something that could have been awful. The same procedure might have saved Barrows Hall and the vista of the Campanile.

There was a little too much tendency in those days on the part of some of our consultants to say, "Well, every architect must express himself. You can't ride herd on them!" [Laughter] I made myself, I think, quite obnoxious, but I'm not an architect, so I couldn't speak with any authority. All I could do was to say harsh things. I think my worst crack was that I thought their rule was, "A building doesn't have to be cheap, it simply must look cheap!" [Laughter] Some reporter picked that up, and it got under their skin, I think!

Architects - and especially big architectural firms - need an exacting and critical client with good taste. Unfortunately, it is difficult for a board such as The Regents and the University officers to function in that way.

N: It's a very interesting concept about the uses of experts, isn't it? Where does the final authority lie?

McL: I really think that to get a great, unified, beautiful campus you need a very strong, dictatorial, and very competent, artist or architect at the top. Now John Galen Howard was that. He was both the supervising architect concerned with the whole campus and also the actual architect who designed and built the buildings. The University's greatest period of architecture was under his rather dictatorial handling of the problems--there were no other architects called in. Of course, you couldn't get away with it today. The University when I was on the Regents had a large panel of approved architects. A particular architectural firm would be selected for a certain building. The Regents used to require some of them to submit examples of what they had done before a choice was made, but it was almost impossible to get any of them to submit sketches or indicate the sort of design he might have in mind before a recommendation would have to be made by the Committee on Grounds and Buildings.

Unfortunately, when an architect or a firm was selected, most of them seemed to be dominated by a desire to make the new building his own monument, different from anything else. By the time the Regents had a crack at it, $50,000 or so probably had gone into the preliminary drawings. It's difficult and expensive to change things

McL: after you've spent that much money. So that's why we get such a heterogeneous lot of things.

N: It really looks as though it was done by a committee, doesn't it?

McL: It does. Dreadful. But it is even worse than that, for faculty committees generally want to influence some details. The campus office of Grounds and Buildings, as well as the consulting architect, becomes involved and the Regents Committee has to approve at certain stages. An aggressive and skillful individual, some place along the line, can have a lot of influence, but such people with good taste are rare these days.

N: I don't think art really works that way.

McL: No, it doesn't. Most contemporary architects seem to have lost any sense of grandeur. Yet, in spite of the prevailing drabness of the times, the campus does have an extraordinary, peculiar charm of its own. It has been possible, so far, to preserve most of the good areas and to keep the largest of the new monstrosities on the periphery of the campus.

I've received a good deal of ribbing for my liking of buildings with tiled roofs. [Laughter] For example, I think the red roofs of the Library, the Mining Building, California Hall, and other old buildings, add immensely to the beauty of the campus, particularly when you look down on them from the Campanile or the hills, whereas the boxes with the flat-topped roofs simply present a lot of flat, black tar-covered areas with cluttered puddles and exposed plumbing which to me is down right hideous. So I was anxious to get finished buildings with sloping roofs on them. At least Jack Warnecke came through with some red tiles on Birge Hall and Campbell Hall. The proportions of Campbell Hall are not too good, perhaps. I think Birge Hall, behind the Campanile, is better. I am really not too enthusiastic about the frieze of tiles on these buildings. Someone on the faculty called them McLaughlin Hats, and I am sure he didn't intend to be complimentary! To my taste, the roof on the older John Carl Warnecke's building--Le Conte Hall--is more attractive and would be safer, too, in an earthquake.

N: Possibly your liking for tile may have had some origins in the Hacienda?

McL: Well, it may have. [Laughter]

N: Such pleasant associations, and the tiling was very appropriate too.

McL: Yes. I do feel these buildings without a sloping roof, just flat, office-type boxes are terribly ugly. Of course, some designs may require a flat roof, but not all of them. A collection of buildings

McL: shaped like filing cases is pretty dull, and when they are black, they are too depressing for words. Fortunately, we have escaped the black plague on the campus.

N: Are there any other buildings on the campus that you have been particularly interested in?

McL: I think the round building that Michael Goodman designed--the Chemical Biodynamics Laboratory is a very nice one. I think Melvin Calvin was responsible for the concept of a round building, and Michael Goodman developed it quite successfully.

N: Is it especially functional?

McL: Oh, I think it is. I think it's very successful. I think Melvin Calvin's idea was a wonderful one. I've made such nasty remarks to Michael Goodman about the virus laboratory--and Michael Goodman's a close friend of mine--that he said, "I'll show you what a really handsome job I can do when I get my next building." And he did just that! The first designs were particularly lovely. A great deal had to be cut out for reasons of cost, but even so I think the building's very charming. Unfortunately it is located where it is overpowered by the harsh monstrosity of Wurster Hall! [Laughter] It deserves a better environment!

N: Is that the one that has a round, sort of a lecture hall next to it?

McL: No. That low lecture hall? That's the Physical Sciences Lecture Hall adjacent to Latimer Hall in the chemistry group. No, this building is right in back of Wurster Hall, and it has a round, quite a lovely tiled roof. It's a circular building with a colonnade around it. It really is quite lovely. It's a great shame that it's where it is. It should be in a more conspicuous place. I think you were referring to that very well equipped science lecture hall which was sunk alongside the chemistry building so it wouldn't be too conspicuous. Its greatest merit architecturally is that most of it is underground.

N: Yes, that's the one. Were you at all involved in the design of the Student Union area?

McL: I probably expressed my opinions emphatically now and then. I was very much interested in the concept. I was one of the judges, one of the two Regents on the five-man panel in the contest for the residence halls, the one Jack Warnecke won. Then I was again on the committee for the Lawrence Hall of Science. The firm of Anshen and Allen was the winner at that rather more interesting competition. That was another contest. I was also on the jury for the Art Museum that's going up now. A bold design by Mario Ciampi was selected. I think it will work out well, but some may consider it a bit extreme. And I am not too pleased with it.

N: Thinking a moment about the residence halls, do you have some observations about their design and execution?

McL: In my judgment the design that won the competition, the one Jack Warnecke submitted, was by far the best. The concept of the cafeteria in the middle of the block, with the four rather tall, slim buildings on the sides is good, though I'm not too enthusiastic about the buildings themselves. I find the tall rectangular boxes the architects give us these days are a bit monotonous and hard to enliven or to keep from being awfully institutional in feeling. Warnecke's structures seemed better proportioned than the others submitted in the contest, but I wish that some way had been found to make them a little more graceful and personal.

N: There seems to have been some slippage in what a committee interested in housing wanted in the way of residence halls and what the design developed into. Were you aware of this?

McL: As I recall the discussions, there was no clear concept that the many concerned individuals or groups seemed to agree upon. The need for housing was emphasized and not questioned, but the ways to meet it weren't studied as critically as they might have been. I don't remember how many architects submitted their schemes for the competition for the Berkeley houses. Quite a few. Then the jury of architects and Regents selected the winner. After it was settled, everybody involved had a crack at it. It's awfully hard to get any unanimity of opinion about what you want or what you don't want. By and large I think it worked out pretty well, although I'm not too happy with them. I think they are the best of the various residence halls that have been built, with the exception of the clusters of buildings in the Santa Cruz colleges and the first low ones that were built on the Santa Barbara campus. At the time, I think nearly everyone was too much concerned about the urgency of the need for dormitories on the campuses -- and the result was too many big buildings were put up that had a cold, institutional look about them in spite of efforts to make them liveable.

N: Have you had any occasion to be interested in the architecture on the other campuses, or is it just Berkeley?

McL: I was interested in all of them. The dullest, in my opinion, are the huge dormitories at UCLA. They are prime examples of the grim institutional school of architecture.

I am afraid I remarked in a short speech at the dedication of one of them -- Rieber Hall perhaps -- that the most attractive thing about the new dormitory was the view of the older structures -- Royce Hall and the Library -- across the field to the east. I was really trying to find something nice to say, but Welton Becket, the architect, didn't seem to appreciate it.

The Santa Cruz Campus

N: Was the Santa Cruz campus being developed at this time?

McL: It was the time when the sites for the three new campuses were selected -- quite a study in itself with a lot of professional advice and local pressures -- then submission of general plans by one or more architectural firms followed by review and action by the Regents. Jack Warnecke was the architect chosen to draw up a general plan for the Santa Cruz campus. The concept of separate colleges had been proposed and approved and Warnecke, of course, based his design in accordance with it. The various colleges were located as clusters of relatively small buildings on the edges of the forest, conveniently placed in relation to laboratories and the library and other buildings that served the entire campus.

The creation of separate colleges was an academic plan endorsed by the Regents. The President himself (Clark Kerr) and Dean McHenry, the first Chancellor, really deserve the chief credit for the concept. Warnecke had the exciting assignment of working up the broad design on this basis -- the location of major buildings and the distribution of the college groups, with provision for centers for additional disciplines as the Santa Cruz campus grew. Tommy Church, too, was involved with landscape plans, which were, of course, of particular importance in the development of this campus where the combination of forest, ravines, and open fields -- even an old quarry -- created a rare opportunity for an architect. And some hard problems, too. At the time, I had rather hoped that there would be a mixture of formality and informality and have a couple of the major buildings at the top of the open slope with the forest as a background, so designed to take full advantage of the commanding setting with the view over Monterey Bay to the south and then let the rest of the structures drift back into the trees. That idea really never got off the ground, even with my fellow Regents.

In Warnecke's plan, which was accepted, some buildings were on the edge of the forest but most of them were back in the trees. As it has worked out, I have become very pleased with it. It is truly a charming, unique campus -- with informality the prevailing feeling-- but I rather think in such a wonderful site a little more traditional elegance outside the trees might have been good too. But nobody else felt that way. Perhaps we'll still get it in some more opulent age. [Laughter]

I've often wondered what Bernard Maybeck would have done with this superb site. Maybeck had such a combination of talents, for he was an architect who loved grandeur and at the same time could do such extraordinary things on a smaller scale in his timbered houses in Berkeley. The Faculty Club is a fine example. But on the

McL: other hand, even an early sketch of a plan for the Berkeley campus that he prepared was most formal -- and decidedly on a magnificent scale. Then in 1915 he built the Fine Arts Palace in San Francisco. The site at Santa Cruz would surely have excited Maybeck. I'm confident he would have taken advantage of the great long open slope and the background of trees by placing at least one magnificent building against it -- a structure that would have been in harmony both with the wide sweep of the broad field to the south and with the vertical lines of the redwoods. Not necessarily a Fine Arts Palace, but a bold building to provide a center -- a focus -- for the whole design, worthy of the magnificence of the site. Then I am sure he would have displayed his own very personal style in smaller-scaled structures back in the trees.

N: Did you know Bernard Maybeck well?

McL: I didn't know him intimately. I was much younger, but I did know him pretty well. A class-mate of mine -- an architect -- Pete Bangs, once said that Maybeck was an artist who became an architect. He designed Mrs. Hearst's place up on the McCloud River, Wyntoon. But perhaps I'm going on too long about this.

N: No, not a bit. You are in a fine position to have seen and judged the different opportunities for architecture on the campus. The rest of us can only complain. [Laughter]

McL: Well, I did a good deal of complaining too! [Laughter]

The Irvine Campus

N: Were you also interested in the Irvine development at all?

McL: Yes, very much. I was down there, I remember, at one meeting when we went out on the middle of the campus with Bill Pereira and some of his staff. [William L.] Pereira was the architect engaged for the general plan and I found his initial designs very exciting. Irvine seemed to me to be the least interesting of the new sites, as far as topography and surroundings were concerned. But the open space and the lack of any intruding structures gave an architect a pretty free hand - which was rather unusual to find in southern California.

N: What is it like? I've never seen the Irvine area.

McL: Rather low, rolling hills of sparse grass - poor soil, not even good ranch land, back of Newport Beach which is something of a

McL: resort town. The hills are on the south side of the valley of the Santa Ana River. It was always rather -- I perhaps shouldn't say this -- a depressing place to me, particularly under a colorless smoggy sky. [Laughter] But it was an immense area, an immense site. It was a wonderful gift. I really think that the big acreage donated by the Irvine Estate is the largest private gift the University has ever received. Of course, they stood to benefit by it too, very much, but it seemed to me to be rather petty to question the motives and propriety of this great gift just because the building of the University would add value to the surrounding land.

N: Yes. There was to be a city developed, wasn't there?

McL: Yes, all around it. So it is bound to develop into a great community. It was exciting to see the plan grow as Pereira worked up a broad design with buildings in concentric circles. That's the dominant feature in addition to a distinctive contemporary style that has a lot of character. He's undoubtedly a very imaginative and skillful architect.

N: Do you see the ocean from there, or is it too far?

McL: It's generally too smoggy to see it. But it's not a beautiful view. You can barely see the ocean off in the distance if you can see it at all. It's not the thrilling site that the Santa Cruz campus is. Oh, and Berkeley surely has one of the truly great sites in the world. Santa Barbara, with its beaches, is good too, but the view toward the mountains to me is its best feature. The new site in San Diego is another wonderful piece of land, particularly where the slopes drop off to La Jolla or where it approaches the high cliffs along the ocean. To find and acquire three new sites of such quality and size, in such good locations, was really an extraordinary piece of good fortune, as well as good judgment.

Systematic Campus Plans

N: Was it determined that each campus should have its own architectural style, or that they should be different?

McL: There wasn't very much thought given to that. An architect was appointed to work up the general plan, and each architect certainly had to put his own personality into it. Pereira had the plan for Irvine, and in the first buildings, he established a style that undoubtedly has great distinction.

The plan Warnecke gave us for Santa Cruz, too, is imaginative

McL: and particularly well adapted to the forest site. He also designed the library there -- one of the first major buildings and a very handsome structure. Alexander presented the first plans for the San Diego campus. An entirely new plan was also needed, when the University of California, Santa Barbara was moved to the site near Goleta. Pereira and Luckman were given that assignment and they not only developed the general layout for the expanded campus but established a style -- particularly in materials and color -- that has generally been followed by the succession of architects who did particular buildings. They were all interesting concepts. They were submitted, re-submitted and discussed in the committee a good many times. Many suggestions were made and some changes resulted. But by and large, the broad patterns for the new campuses that the respective architects submitted were accepted.

In those years, the Regents, and especially the Committee on Grounds and Buildings, were also giving a lot of attention to the older campuses and trying to establish good systematic plans that could be followed as the campus grew.

At Davis, Gardner Dailey worked up a new layout for the campus, taking into account the existing pattern, but adjusting the new buildings, the new structures, to it. It's a totally different type of campus, of course, with its own distinctive quality -- big trees and flat, fertile lands. It has rather an unusual charm, but I think it is an interesting campus, too. Of course, on each of the new campuses, the architect had definite guidelines established by academic plans that had been worked out at least in a preliminary way. At Santa Cruz and San Diego the concept of colleges prevailed. Irvine was to be on more conventional academic lines, as were Santa Barbara and Riverside -- perhaps unfortunately, in the latter case.

Growth and Academic Standards for the University

N: Of course you were on the Board of Regents at a particularly interesting time, when there was so much new development.

McL: Oh, it was a fascinating time. I really think one of the lucky things in my life is getting on boards or into jobs at the right time, and getting out at the right time. [Laughter] I was so lucky that my term ended when it did!

N: You're perfectly right! [Laughter]

McL: For I had the opportunity to participate in that delightfully good period of great growth of the University - great expansion in its

McL: faculty and its quality, and the immense expansion physically and architecturally.

I think the development of the University measured by the distinction of its faculty attained its great momentum under Bob Sproul, and it was maintained by his successor, Clark Kerr, especially in the staffing of the new campuses. In the period of President Kerr's administration there was an amazing expansion physically, acquisition of these new sites, superb sites, and the building of what were really three new universities. Of course, it shouldn't be forgotten that UCLA was developed principally during Sproul's administration and Davis, Riverside and Santa Barbara were started as well.

N: Do you have the impression that there is going to be a pause now?

McL: Oh, I think so. In this turmoil today, [1970] I would rather see - and I don't think there's proper emphasis being given to it - improvement in the quality of the University with effective restraint on its growth. I would meet the problems of the University today by much more exacting standards for admission, much more exacting standards for performance, and really make the University one that serves the intellectually elite of California. By that I don't mean socially elite, I mean intellectually elite-- the elite of any race, or any walk of life. But I think it is an appalling thing to try to turn the University into a welfare institution, and let everybody in just out of the goodness of your heart - or sentimental concern about down-trodden minorities.

We have in California the three tier system, with the junior colleges, the state colleges, and the University, so that anybody who has any ambition at all can get an education beyond the high school. The University should be, I think, primarily for the people who are most capable of benefiting by intensive and exacting training. Our civilization will have to depend on it if it is to survive. It is easy enough to recognize the need - and make the selection of students - in science, and medicine, and technology, and I think the same concepts are equally applicable to the humanities. It's more difficult, perhaps, to measure progress in those fields, but in science and technology and medicine, if you can't meet well defined standards it's perfectly obvious a student shouldn't undertake such work.

What led to this exhibition of these prejudiced views of mine was your question about the growth of the University. I don't think it needs to grow a great deal more physically, but let's improve what we have. I think you can hold the enrollment at the present level, just as Harvard's been held at a certain modest rate of growth for years, and it hasn't hurt Harvard in the least. We perhaps are not seven Harvards -- yet. But Berkeley certainly matches Harvard

McL: today and each of the other campuses is developing in distinctive ways that are receiving wide recognition.

N: Do you think there are any problems in adhering to these standards on the part of a public university?

McL: I think there are difficulties, but the University of California has held to high standards until very recently. Now I think not only the University of California but many other leading institutions are letting down; largely by--well, I'd better not expose all my prejudices. [Laughter]

N: Well, you know, one generation's prejudices may be the common sense of the next, so I think your views would be very useful.

McL: I do think it is indeed a difficult thing to maintain consistently high standards in a public university, and yet when those standards were being maintained and when you had a student body which was well-disciplined intellectually and appreciated the great opportunities the University offered, and was really an elite body, the people of California were enthusiastic about the University. But I assure you the people of California are not enthusiastic about the University today. I think you can build up tremendous support for a great University that is doing the highest quality work in all fields, and you'll get popular backing at all levels. Even though only a rather small fraction of the people will be able to go to it, they'll be proud of it. Now they're not proud of it, which is a tragedy.

We're not setting up a system of higher education that would be available only to a small group. We have the state colleges, and the junior colleges, which can take a much larger group of less-well-prepared people, and adjust their training to them--make it more effective for them. But it's really, I think, an extremely bad thing to let groups into the University who can't do the work. We just create frustrated people. I think that applies especially to some of the ill-prepared Negroes who are almost being recruited as if to meet a vague quota. We can let them in with the best of good will to do something for them, but it is harmful if we lower our requirements in order to admit them and to retain them if they're not able to meet our high standards of performance -- just as whites with the same poor qualities would be harmed. There are the state colleges and junior colleges to take care of them. I think it's a dreadfully bad thing for the brilliant, able Negro who comes in, who meets all our requirements and does good work, only to find himself regarded as one of a group that had to have special treatment and privileges to make the grade.

N: Of course, there are efforts to tutor and help people through, and apparently this has worked for some. You think this isn't appropriate?

McL: I don't think that's the way to do it. Let them come in on their own, let them measure up to the University's standards, the way the Japanese and the Chinese have for the last 50 years. Many of them have done brilliant work - and won our highest honors.

N: I suppose it's an attempt to solve a social problem.

McL: It is. It's making the University into a welfare organization, whereas I think the major emphasis should be on high intellectual and professional achievement. Gradually more members of the races that are less privileged today will measure up to it.

N: This may be the key term: as you say, gradually. This isn't a very popular word, now, of course.

McL: No, it isn't. I'm sure what I'm saying is not a popular approach to the problem today. Too many want instant education.

N: Impatience is an element.

McL: The impatience is there but the discipline is not. I mean intellectual discipline. You can't go into engineering and just jump through on good verbalism. You've got to have careful preparation to start with and build up competence through a sequence of related studies.

N: This would suggest an upgrading of junior college and other school offerings.

McL: Yes. Also, of course, today we take in a great many people in the third year from the junior colleges. (I believe they are called Community Colleges now.) They do good work, although I have heard the comment made that the boys from the junior colleges who enter the University in the junior year and do well are the boys whose grades and standing would have let them enter the University as freshmen. This rather gives one confidence in the criteria by which selection of high school graduates is made. I shouldn't, however, continue to reveal all my prejudices!

N: If they're the convictions of a lifetime I don't know that prejudice is really the word I would use. You can't always be popular with everything you think, and that's not the point, really. It's important to catch people's ideas as of a certain time because someone coming back to this era to inquire should have a chance to hear what people are thinking now, especially people who've had the sort of experience you've had.

I'd be glad to hear anything more that you have to say about your views of the University structure.

McL: Well, I think I've already shown how out of step I am with some of

McL: my liberal colleagues. [Laughter]

N: If some more thoughts come to you, let's just go right into them.

McL: I do think the future of the University is not expansion in numbers; it's improvement in quality. At Harvard they have perhaps five or ten times as many people who are qualified, applying to get in, as they are able to take. Here, our standards are just about as high, but everybody who is qualified is accepted. But at both institutions, special consideration is being given to people who are presumably unable to meet the intellectual requirements, because of alleged prejudice based on race or some other concept currently popular. Consequently, many universities are admitting a lot of people who are not qualified.

I would be inclined to move in the opposite direction and raise standards until the University, big as it is, would be limited to the people who are best prepared to take advantage of the highest sort of education. And of course, that means that we must maintain a faculty--a devoted faculty--worthy of the students of the highest quality. I think that would also have to be accompanied by adequate financial aid for the able students who need it, so that we would not be confining the University to the affluent. I'd like to see our ability to select improved tremendously. I'm afraid that we may be missing some of the best under current procedures, but that's a technical matter.

When the Regents gave the Chancellors the right to admit--what was it, up to two percent or something of that sort--of applicants who had not qualified by the formal standards, I know the idea was expressed that the objective was to try to catch the genius, let's say the boy who was a wonderful writer, but simply couldn't do mathematics, or the boy who couldn't write a good English sentence and yet was a genius in mathematics, or music, or something of that sort. I suspect that this has been abused now and then to let in long-legged basketball players. [Laughter] Increasing that bracket largely to take in what they call the underprivileged is the wrong approach. It's fine to take in the underprivileged if they are prepared, but that preparation should be accomplished before they get to the University.

N: I suppose part of the problem is that if you are really underprivileged, you don't have preparation, and where do you start?

McL: That surely is a serious consideration--and yet some of the greatest people in our history have come from underprivileged ranks of society--people who had the spark--and are hungry for success and then some of the worst people I've known have been some ot the wealthy playboys. Yes, I can think of some examples! [Laughter] I won't mention any

McL: names! [Laughter]

N: You just look wise! All right. Well, this does really bring us to the issue of tuition charges for students: do you have some view about this?

The Tuition Question

McL: I'm glad I'm not on the Board now to participate in that decision. I don't think it's a clear-cut issue. I don't object to a system with tuition where a special effort is made to search out brilliant people and bring them to the University with adequate scholarships--waiving tuition, or giving them scholarships in lieu of it. But to do that right, I believe you'd have to spend some money in searching for such talent.

I wouldn't use it as a welfare device; I would search for brilliance in all walks of life, and I hope we'll work towards something of that sort in the long run. Just a harsh imposition of tuition without any effort to lessen that financial blow could be a pretty grim thing. I don't know how wise the decisions will be in that. I find myself in disagreement with Bill Coblentz or (Fred) Dutton on the Board on one side; I can't say I agree wholeheartedly with some of the recent appointees on the other side either! [Laughter]

N: That's always the thinking man's position, isn't it? It's hard to take up wholeheartedly with either side.

McL: Well, there's a good solid middle group of Regents that I think have wisdom.

Governor Warren and Appointment to The Board of Regents

N: We were going to get you back to the University of California after your years on the faculty at Harvard. Of course, not long after you came back to California you were named Regent.

McL: Yes, it was shortly after I had served on the alumni committee concerned with the oath controversy. Mario Giannini had just been reappointed to a 16-year term, and he resigned, I think, a few months after that. I was appointed to replace him.

N: So you had already had your taste of battle before you ever became a

N: Regent yourself.

McL: Well, a little bit in the alumni committee, on the Loyalty Oath, but that was a gentle sort of a thing. [Laughter] I remember I had got in from New York, at some very early hour in the morning, and was in bed, asleep. The telephone rang, and it was Earl Warren. He said, "I've been trying to get you for the last few days; where have you been?" or something. I explained and he replied, "Would you accept appointment as a Regent of the University?" and I said, "I'd be delighted to," and he said, "That's all I want to hear. It's practically for a sixteen year term, and I know how old you are, so I don't think you'll want another term!" [Laughter]

N: It is a bit unusual for the governor to do his own telephoning, isn't it?

McL: I guess so. Well, I know him quite well. He is a good friend--a member of our camp at the Bohemian Grove. I'd seen him quite a lot up there. So, that's the way it happened. Of course I was quite pleased.

N: Yes. I can imagine.

Some Observations on Warren and the Court

N: What is your general recollection of Warren? I suppose you knew him best when he was governor. Is that correct?

McL: Yes. I've seen very little of him since he left California. I'm not a close family friend of his; most of my friendship has been through our camp at the Bohemian Grove, where he was a member--and through my association with him after I was appointed to the Regents. The camp, called the Isle of Aves, at the Bohemian Grove, is really a very intimate group of friends. When he was governor, he was up there nearly every summer. One has a chance to sit around and talk a lot. He's been there several times since he's been Chief Justice, too.

Oh, he's a delightful human being, a lovely person. One you can be very fond of.

N: Yes. Do you have views on his political attitudes?

McL: Well, as a conservative, I've been a bit critical of the Warren Court, but I think he's been a consistent liberal. I am sure he will be regarded as one of the truly great liberals of the times. My criticism, or disagreement with him would be that basically I'm not

McL: a liberal. I think the liberal philosophy that has been so consistently followed by Warren has led us into many of the troubles of the times. I have great respect, however, for the honesty and depth of his convictions even though I am a bit skeptical about the end results of some of his decisions.

In my book, I would much prefer a stricter interpretation of the Constitution. I am much more of a traditionalist. This country's lived and prospered for a long time under much more literal interpretations of its provisions.

N: Which aspects are you alluding to?

McL: One example would be emphasis on the concept of <u>one man one vote</u> - a concept not specifically stated in the Constitution - and the denial of the right of states to require qualification of any sort for the privilege of voting. The decision on reapportionment of state legislatures is largely based on this position, in spite of the recognition of geographic distribution as a basic consideration when the framers of the Constitution established the Senate. I worry when so many safe-guards are weakened that were originally set up as protections against the dangers of unrestricted democracy.

Unfortunately, the court tends to reflect the political climate. I think Dr. Dooley pointed this out years ago - but when a long background of decisions concerning the meaning of the Constitution is disregarded, traditionalists are apt to be disturbed. I think the Warren Court went further and faster in expressing the general feeling of the times than many felt desirable - particularly those elderly people like myself who question the persistence of many of the currently popular dogmas.

Another example is the prevailing interpretation of the guarantee of the freedom of speech. Today you can do almost anything, call it free speech and get away with it.

The obscenities that are shouted now so frequently on the campus would have put a man out of the University 20 years ago, without any question. And now it's called "free speech." It certainly is, but I am sure it is not what the members of the Constitutional Assembly were trying to protect.

N: There's a decline in civility, there's no question about that.

McL: Yes. The left-wing--we're getting back to some of our local troubles--the left-wing group, which is now really anti-liberal also, has just used the Bill of Rights as a shield. The courts have given them unwisely broad protection, I think, by the succession of liberal decisions over the past decade or two.

N: Are you thinking of the criminal proceedings, the confession issue?

McL: I think of the many decisions of the higher courts that make it awfully hard to get convictions, to carry things through effectively in the courts.

One of the great things Warren did in California, however, was appointing a very high-grade judiciary. His appointments were excellent. My regard for Warren as a governor of California is very high indeed. That's not entirely based on his wisdom in selecting me as a Regent!

N: Good. Was Roger Traynor one of his appointees?

McL: Yes, I think so. Most of his appointments were great liberals, but able jurists as well, and they were also men of real character.

N: I see. You are really looking for character, perhaps, rather than for political conviction as such?

McL: It may be. The only other member of the Supreme Court I knew well was Felix Frankfurter. I knew him at Harvard. Felix Frankfurter was certainly an outstanding Roosevelt liberal. With my convictions, and my political feelings, I was inclined to be rather antagonistic to his views, although I regarded him as a good friend. On the Court, he was, above all, a great lawyer. I'm sure he would put the law, and the rigorous interpretations of the law, the meaning of the law, above his own political or social convictions. Strangely enough, he turned out to be far more of a traditionalist than many would have expected.

I think this is the reason why he became regarded as almost a conservative in his later years on the court -- at least by my left-leaning liberal friends. In this connection, I can't help thinking of a comment he made to me early in the days of the New Deal. I had overtaken him and Harold Laski (then at the London School of Economics) on the way to lunch at the Harvard Faculty Club. I was walking between them when something provoked Felix to shake his finger at Laski and tell him that what America very seriously lacked was an intelligent conservative opposition--and then asked me why didn't the industrial and business world contribute men who could provide such leadership.

N: Again, that sounds like an appeal for character.

McL: Yes. But sometimes men of the highest character can disagree in their interpretation of the law.

Felix probably had just as deep liberal convictions as Earl Warren but I think in his case the law, and the legal interpretation, was the thing that dominated his decisions. Whereas I think in Warren's

McL: case, if he thought something was right - and he often used that phrase, "Is it right?" - he would find a justification in the Constitution or the law for what he thought was right. He had deep feelings about what was right, whereas I think Frankfurter's feeling would be, "Is it the law?" But they were both leading liberals in the contemporary meaning of that abused word.

N: Speaking of the Supreme Court--I think we're all very much interested in it, particularly now--who were the leading conservatives that you have admired on the Court?

McL: I'd have to go back to Hughes, I think. He was a great conservative on the Court. And, of course, going back farther, I think Mr. Justice Taft was a great conservative and a very distinguished judge on the Court, probably more distinguished as a judge than he was as President. But I don't think we've had many able conservative leaders recently on the Court or elsewhere.

N: Different eras seem to call forth different leaders.

McL: Yes, don't they? Well perhaps some of the new appointees will turn out to be conservative leaders.

N: Well, we shall see. I must say, Mr. Blackmun has certain promising qualities.

McL: He sounds all right.

N: We'll hold a good thought for him.

McL: Yes. He'll probably need it! [Laughter]

Provosts, Chancellors and Presidents

N: Shall we pursue the Regents again? You were on deck there, weren't you, when the first chancellors were appointed, that was, after the chancellor system was adopted?

McL: Yes. When I came on first we--let's see, what did they call them--Provosts, I think.

N: That's right.

McL: Monroe Deutsch was nominally in charge of the Berkeley campus, but in those days Bob Sproul really ran the entire show. [Laughter] I don't think he could have made the transition from the old presidency to the type of presidency that we have today very easily. He

McL: really was the ideal president for his period. He was the "Prexy" type of president that everybody knew, everybody loved. He was a great figure. Of course, that was primarily on the Berkeley campus, and to some extent Davis. I don't think he was ever quite able to establish that same position in Los Angeles, though he lived there for half the year at times. But coming from Northern California, I don't think he was ever able to be the dominant personality on that campus that he was up here.

That type of president is something that's passed. I think we have a man now in Charlie Hitch who's ideal for the contemporary presidency. Extraordinarily able, analytical mind, but he's not a person to get out, and have his voice carry all over the stadium at a rally! [Laughter]

N: Although people suggest that he's witty and engaging.

McL: Oh indeed he is! He's witty and charming, and makes a delightful speech, but he's not the orator to stand out and roar in Sproul Plaza [laughter] and slow the crowd. I may be mistaken, maybe he is. But I am sure he won't try to do it himself. That's not his role. So the qualities that you look for in a president today are quite different from the qualities perhaps that we needed in the older days.

N: This might be interesting to pursue a bit. Now you're looking for certain qualities in a president and certain qualities in a chancellor.

McL: Yes, the chancellors are closer to the role of the president in the past. I think that some of the qualities that we used to look for in the University presidency of the old days one still wants to find in the chancellor. You want somebody who will be well known and admired on the campus. He should be recognized as a leader that the students respect and like, and even have affection for. I think we do look for that sort of person. One of the outstanding chancellors in my day was Emil Mrak at Davis. He was a dominant personality on the campus there, in a good sense of the word. Everybody knew him, everybody was fond of him, there were legends and stories about him, and I think he did a great job up there at Davis.

N: Is the size of the establishment part of the problem?

McL: The size and character of the place is to some extent. Now, I'm not sure Emil could have done the same thing at Berkeley, but he certainly did a beautiful job at Davis.

He belonged to Davis, and everybody knew him, admired him, and regarded him as the leading personality of his campus. Undoub-

McL: tedly, Franklin Murphy and Roger Heyns were as highly respected and successful in the different settings at UCLA and Berkeley where Emil's down-to-earth approach probably wasn't needed or wouldn't have been as effective. That doesn't mean I haven't great admiration for our succession of chancellors, for we've had some very great people in those positions.

N: Are they nominated through the faculty or is this entirely a Regents' decision?

McL: Legally they are appointed by the Regents, but the Regents follow procedures established in the Standing Orders of the Board. The President formally submits a nomination, but prior to that--or even after--various names are reviewed by committees of both the Regents and the faculty. Not generally one name, but a slate is requested from the faculty.

The Regents usually have a committee appointed--a special committee of Regents--to review names and express preferences. The committees on which I have served worked in closest cooperation with the President and the faculty committees. They are really advisory to the President--but when his nomination is submitted, the views of the committees on the candidates and on others are likely to be expressed and discussed by the full Board. If the President's nominee failed to be approved by the Regents, other names could of course be reviewed and recommended to the President--but that hasn't happened, as far as I know. The most dramatic one I participated in was the selection of Roger Heyns at a time when it was most urgent to fill an anticipated vacancy. I can assure you it was an answer to a prayer when Roger accepted! [Laughter]

N: Shall we go on with the appointment of chancellors?

McL: That procedure, as I outlined it, is the one that's followed. The Regents surely should never, would never--at least the Regents then would never have thought of putting up a chancellor who did not have the endorsement of the faculty. I think in every case, every appointment was made with strong endorsement of a committee that spoke for the faculty.

N: So it would be an Academic Senate committee.

McL: Yes. I think in all cases there was a general agreement on the man we wanted to get. You can't, of course, debate such a matter in the Academic Senate, because you don't want to talk publicly about the favorable and unfavorable characteristics of a person under consideration. The whole thing has to be very confidential, both because you don't want the University to be humiliated by being turned down, and you don't want a distinguished man to be humiliated by being

McL: proposed and passed over. So in most cases we started with panels of perhaps twenty-five or thirty names. You can eliminate a lot of them for obvious reasons - age, reluctance to leave the post he has, interests incompatible with ours, etc. - then you get down to discussion of, say, four or five names. In all the cases I was involved in, both the faculty group and Regents' group several times met informally together and agreed: "Well now, this is the man we ought to try to get, number one." I don't believe we've ever had our number one man turn down an offer. But the nomination is formally made by the President and the appointment is made by the Regents.

N: Now at this juncture, Chancellor Strong had withdrawn, is that right? And then was Martin Meyerson in office?

McL: Yes. Martin Meyerson was "Acting." Of course his name was reviewed too, but Martin had had the responsibilities of the chancellor's office during a brief period of great tension, and it's quite understandable that he had both strong supporters and very sharp critics.

N: Yes, it's almost impossible to ride in fresh once you've been on the job.

McL: It would have been difficult, I am afraid. I don't think either the faculty or the Regents felt that at that time, when we were trying to get somebody who would unify the Berkeley campus that Martin was the one to do it, though everyone recognized that he was a very able person. He had taken charge in a rough period, and had met a succession of difficult situations with courage and skill, but not always in ways that had won full approval either by the faculty or the Regents.

N: There are many elements, aren't there, that you have to consider?

McL: Oh, many elements indeed. His name, of course, was one of the names that was given very serious consideration. Then, as I remember it, Roger Heyns came out on some assignment--I've forgotten just what the assignment was--but it gave us a lovely chance to meet him and find out what he was like. He was already very high on our list of possible candidates.

N: Was he still, then, at the University of Michigan?

McL: He was vice-president at the University of Michigan. He came out on one of the assignments of a scholarly nature that attract academic administrators. Probably there was an ulterior motive in extending the invitation. Anyway, the members of the committees had a chance to talk to him and everyone was most favorably impressed. Of course, it was thinly camouflaged by saying that we were seeking his advice. [Laughter]

N: I'm sure you all knew exactly what was going on.

McL: Exactly. Roger Heyns made a very good impression, both on the faculty committee and on the Regents' committee. I'm quite sure there was no hesitation whatever on either side--the feeling was unanimous. Now let's go after this man as the number one person that we want. Roger accepted, which pleased me very much at the time and has pleased me ever since!

N: About how large would this Regents' committee be?

McL: Generally about five.

N: I see. Quite a small committee.

McL: Yes. Such committees should be kept small. The larger a committee, the more danger there is of a leak, and leaks are terrible things when you're dealing with personalities. You don't want the University to be shopping around and being turned down, and you don't want a man to feel that "I was considered and turned down." Many good men - even very distinguished men - for one reason or another, may not be suitable for a particular job. They might be very great men. So even the Legislature recognizes that such matters have to be confidential.

N: The personnel sessions are exempt from these open-meeting regulations.

McL: Yes. Such decisions as those on honorary degrees must also be highly confidential. In my days on the Regents the idea that there would be a leak about an honorary degree would have been perfectly shocking, because there have been many people whose names have been proposed for honorary degrees who were passed over. For very good reasons, sometimes. The faculty may nominate more people for degrees than is proper to confer and a selection has to be made. Nominations originate in the faculty, as they should, but the Regents then have the final word.

N: Is there any limit on the number of honorary degrees that would be awarded in one year?

McL: I don't think so, but of course it would be a very, very bad practice to be too liberal with honorary degrees. There should be a very small number. So there's rather a tradition--I don't know how many--a maximum of three, perhaps four, something like that.

N: Does the president of the Board of Regents name these committees?

McL: Members are nominated by a Committee on Committees. The Committee on Committees has a very important function to perform. Each year, at the close of the Regents' year, when new officers are to be chosen, the Committee on Committees make its nominations for chairman of the board, chairman of the major committees, and the membership of the major committees. When there's a special committee to be appointed, the members are generally selected by the Committee on Committees unless authority

McL: has been specifically delegated to somebody else to do it. It's a good working procedure. The full board, of course, may approve or disapprove the recommendations of the Committee on Committees, but it rarely fails to approve. In the days of stress, during the Oath Controversy for example, when there was a good deal of division on the board, the Committee on Committees had to face some particularly hard decisions--and make a special effort to submit recommendations that would win support.

N: Were you ever a member of that?

McL: Yes, I've been a member of it several times.

N: I see. You've really been at the center in committees.

McL: But I was not a member when they recommended me for chairman! [Laughter] From some comments I heard, however, it wasn't an entirely harmonious session!

N: When you were then on the Regents' committee searching for a chancellor for Berkeley, what qualities were you looking for, specifically?

McL: We had a list of qualities written out, you know. Systematic people like to do that and it doesn't mean a lot. You can't put down A, B, and C for all these qualities! [Laughter] Some people would feel that first, he must be a great administrator, and others might feel he must command high respect in the academic world for his attainments as a scholar or a scientist. It of course helps to have a list of the qualities that are desired but the weighting each member uses is apt to reflect his own personal background - or prejudices. You certainly don't want a brilliant scientist who just is a complete visionary as far as administration is concerned. Or you certainly don't want an administrator who doesn't know much about the faculty. Really you have to, I think, get to know the man himself and appraise his combination of qualities.

N: So there are some intuitive faculties that you must use.

McL: Well, look at the case of Bob Sproul, who was certainly a great president. When he was appointed President, he was a young man, who had demonstrated ability as Comptroller. He was an engineering graduate, but had done no advanced work. He had, at that time, really, very limited academic credentials, except perhaps in the eyes of the civil engineers. But he was recognized as a good administrator, and as a wonderful personality. As it turned out, his respect for scholarship and ability to recognize the qualities that a faculty member should have made him an outstanding figure among American University presidents. And yet he was not a man who had attained high scholarly rank when he was appointed--but he surely was a great President.

McL: We've had other presidents, going back into history, Like Campbell: a man of highest distinction as a scientist. While I think Campbell was a good President, for he did a lot to build up the faculty, he wasn't regarded as one of the outstanding leaders as was Benjamin Ide Wheeler or Bob Sproul. But in my judgment he served the University well - though I doubt if he really liked the job.

On the other hand Benjamin Ide Wheeler was a scholar and a delightful person who turned out to be a very strong administrator indeed.

So, while you can set up all these qualities, and it's well to have them down, because if somebody was proposed--some particular person and you knew he was just a nice, visionary scholar--you could say, "Well, he's a great man, but he couldn't handle the administration of the University." I know some would feel that way--and quite properly--about certain scholars. And then the possibility of appointing a business man who really knew nothing about the University surely would be very disturbing, particularly to the faculty and to a good many others also. But fortunately, we never had such extreme types proposed.

N: Am I right in thinking that you were a member of the Board of Regents when Clark Kerr was named chancellor?

McL: I was on the committee that recommended him for the presidency. That I know. Whether I was when he was made chancellor or not, I don't remember. I was pretty new on the board, then. I doubt if I was on that committee. I may have been!

N: One would almost think that you would be looking for different qualities in a chancellor than in a President as the University is set up now.

McL: Somewhat. The President of the University today is certainly not as intimately associated with students or faculty as he was in the past, while the chancellor must be close to both the faculty and the students on his campus.

The President really is now quite removed from direct faculty matters, the appointments and the day to day administration, things of that sort. He's dealing with much broader, overall problems.

N: Perhaps you had heard this view expressed, also, that part of the difficulties during the Free Speech Movement--part of the administrative difficulties--had something to do with Kerr's apparent inability to see himself as President and not as chancellor anymore; that he couldn't quite leave Berkeley campus affairs to the chief campus officer.

McL: Yes, unfortunately, in spite of the fact that Kerr as President had made

McL: a great effort to decentralize the administration of the University and to increase the authority and responsibility of the chancellors on their respective campuses. Kerr, when he was chancellor in Berkeley under Sproul, was very restive - really at times most unhappy under Sproul. In fact he threatened to resign several times. Bob Sproul didn't realize the degree to which he kept his hand on the local management, particularly on the Berkeley campus. [Laughter] It was his temperament when some complaints about it reached him, he seemed actually surprised. I remember his saying, "Why, of course I'm not trying to run these things!" And yet he was. [Laughter] Because it was his habit.

That, I think, made some of the chancellors, and particularly Clark Kerr, pretty restive. But then that was a rather short period. After Clark Kerr became President he realized the difficulties of the chancellors, and he pushed and carried through rather thorough reorganization of the University, putting far more power into the hands of chancellors.

N: Now was he able to do that on his own, or did the Regents have to act?

McL: It had to be accomplished by making many amendments to the Standing Orders, which of course was by the action of the Regents. The Regents put through quite far-reaching administrative changes at this time, but only after careful studies had been made by competent outside consultants as well as by committees of the Regents. In all this the President was deeply involved and the final action by the Regents was in close accord with his recommendations. But when the trouble came up on the Berkeley campus, Kerr made the great mistake of moving right in, and really, going over Strong's head. It was, I think, a fatal mistake.

I've said this to Clark himself: his greatest mistake was dealing directly with the leaders of a mob. You don't do that, in my book. You don't invite a group of students, representing a mob, into your office, and sign an agreement with them.

N: What would you have rather had him do?

McL: I would have left the local command in the hands of the chancellor and held him responsible. I would have supported the chancellor in his decision to use police to clear the Plaza and Sproul Hall when he had adequate force available and when the moment was right. I wouldn't have negotiated with leaders of a mob. You can't do that and command respect as an official with authority. The five or six students who were recognized as leaders represented nobody except an unruly minority group trying to enforce its will on the University.

N: They were certainly self-selected.

McL: Yes. Who was Mario Savio? Yet there is a document signed by Clark Kerr and Mario Savio. Well, you don't do that. That, I think, was a fatal mistake. Strong should have resigned with indignation at that moment, but he didn't. I must admit, however, that everyone involved seemed a bit bewildered by the strange events and reluctant to take decisive action.

N: Isn't it interesting that intellectually, apparently, Clark Kerr knew that this isn't what you do, but...

McL: He knew it, because he was a good administrator, and it was just what he was trying not to do. And yet, in the emergency he moved in ways that damaged the local authority on the campus.

N: Ironic.

McL: It was ironic, and it was tragic, too. Because if Clark had gone on to a high post in Washington before the Free Speech Movement had started, he would surely be regarded today as one of the really great presidents of the University of California, of course, he will be - eventually. He created the new campuses, really built up three great new universities: San Diego, Santa Cruz and Irvine, and developed Santa Barbara, Riverside and Davis to full University status. An enormous achievement not only to provide the facilities, but to assemble faculties worthy of the University. Yet I'm afraid Clark's going to be regarded - at least for this decade - as the President who got into difficulties with the activists and was relieved.

N: Well, maybe history will be a little more lenient. Many think he has great qualities.

McL: Indeed he has. And I am confident that perceptive historians will be kind. His own amusing wisecrack at a gathering at Santa Barbara was that he came to the University and left it in exactly the same circumstances: fired with enthusiasm! [Laughter] However, I am sure that was not the case - but he said that himself.

N: Did he really? Good for him!

McL: There again is a person one can't help but admire very much for the great things he did, and yet he did stub his toe badly. At the start, I think it called for a leader like Bob Sproul who could make himself heard in the plaza and could have told the rioters in no uncertain terms what they had to do. He might have gotten away with it.

N: That's interesting; I'm not entirely convinced that he could.

McL: Well, I'm not either, but I couldn't imagine Clark doing that. I

McL: couldn't imagine Ed Strong doing it either. Bob perhaps could have with that roaring voice of his and his personality, and the feeling that the students had for him. They would have listened. No, it might have worked.

Then, of course, you can't allow a policeman to be held in a car for over twenty-four hours in the plaza, as was done, and still be regarded as a strong commanding officer. That is just humiliating. They - the mob - could have been easily handled at an early stage; there was adequate force on hand to do it. Well, we're getting off on a tangent. These things are so much on one's mind today.

Really this whole trouble in so many of the Universities in the country has grown to its present magnitude from these early beginnings when they weren't wisely handled. It's just tragic to see it. Once extremists get away with something, they go on to the next move--the next wilder demand.

N: You were saying a little earlier that you saw a parallel, I think, between what has happened in Latin-American universities and what has happened here.

McL: Very much the same pattern, though ours is more restrained. I am sure it could have been checked with firmness, intelligently applied - with no nonsense right at the beginning, there's a good chance to control such situations. It's like a little fire that you can put out with a bucket of water, but after it goes beyond that, it isn't easy. It certainly was allowed to grow into a full conflagration here in Berkeley, and it has not subsided. It tends to get worse and worse every time.

N: It's certainly the puzzle of our times.

McL: Oh, it is. One of the sad things is that when you're dealing with insurrection of this sort, you really have to act with overwhelming power. Our little handful of Berkeley campus police and the Berkeley city police, who are well-trained, competent people, are put in a humiliating position. They have to stand up and have rocks thrown at them, and they haven't the number of men necessary to catch the rock-throwers.

N: You can't even see the rock-thrower.

McL: No, but if you had three times the number of police, and had them out in the proper places, they'd go right after the fellow who threw the rock, and make an example of him--a really harsh example, if necessary. I think this thing could be handled, but you can't do it with just a little, thin line of police, who can be pushed around unless they got really tough which of course is a desperately bad thing to have happen, as most of them know very well.

McL: Of course it's repugnant to so many people to build up the powers of the police and military strength, but when you have insurrection you're going to have to do it; and this was very close to insurrection. As it gradually gets worse, it could flame into complete insurrection, and it could be happening today in New Haven. Apparently they've moved in pretty strong forces, however, according to the paper this morning. And where there is clearly enough power - visible and ready to be used - situations don't get out of hand.

N: In the morning you hardly know whether you want to read the paper or not.

McL: I know.

N: Well, let's see; we might revert again to some of the University's procedure. Were you at all involved in the naming of Allen at Los Angeles? I think there were two chancellors named about the same time - Kerr at Berkeley...

McL: And Allen at UCLA, yes. That's right. Yes, I remember Raymond Allen seemed like a very fine appointment, at the time. I saw him just the other day in the Cosmos Club, and we had lunch together. In Washington.

N: Yes. You are the most mobile man I know. [Laughter] Was this some mining consulting that you were doing there?

McL: I've forgotten why I was there. Let's see, what was I there for? I had an invitation to attend some function at the State Department, so I was there for it.

N: Sounds pleasant. In our rather extended conversations, we've touched on so many different aspects of your interests, it just struck me that we are now on a chancellor hunt again at the University. Do you watch this sort of thing with interest?

McL: Oh, very much. At least, I'd like to be in the midst of that. There are lots of the Regents' affairs these days that I'm very glad I'm not involved in, but in the selection of a new chancellor, I wouldn't mind The person I'd like to see is Bob Connick. I think he has all the qualifications - just what is needed for the chancellor, but I've heard that he won't entertain the idea. I don't blame him. [Laugh]

N: I understand the committee is very happy to receive nominations from interested people.

McL: Well, I know that his name must be on that list, but it's an awfully hard position to fill. It was like an answer to prayer to get Roger Heyns. At that time we were in a desperate situation.

N: He has shown himself to be a man of great qualities.

McL: He certainly has. A very wise person. Very understanding; it's almost inevitable that anybody in his position at such times would draw criticism from both sides, but he has weathered it well.

N: Oh yes, I'm sure he understood that too.

McL: Yes. He's handled an extraordinary complex series of things very well indeed with not too much wear and tear. There are times, I think, when it may have shaken him a bit, but not too much. You don't see it.

The Regents' Scholarship Program

N: Now I have a note about the Regents' Scholarship program. Does this remind you of any....?

McL: Oh, yes. These special scholarships that were set up. I think that was a matter that was discussed quite fully in the committee on educational policy of the Regents, and it was felt that that procedure was a very good one. Of course, in policies of that sort the President plays a major part in proposing procedures and solutions. Sometimes a suggestion will be made, but nearly always before anything is implemented it comes as a recommendation from the President, and I'm sure that was one of Kerr's many good recommendations.

N: What would these special scholarships relate to?

McL: General scholarships, but called Regents' Scholarships, which were in all fields. They were fairly generous, and there was an effort made to try to do a particularly good job of selection, based on character and promise as well as academic background. Good selection was a dominant concern. I remember in the discussion we hoped that a procedure would be set up so that people who received those scholarships would be looked over and carefully reviewed by competent committees--of course not of the Regents--but of the faculty.

N: Does this have the very interesting provision that the monetary size of the scholarship relates to the financial situation of the recipient? If you are really well-supplied with money, then you get the honor, but not the stipend.

McL: I think so, but I don't know how far that has gone. I remember making the point in the discussion that we should have some awards like an award at Harvard, when I was there, called the John Harvard Fellowship that carried no stipend at all; but it was regarded as quite a nice honor to receive a John Harvard Fellowship.

N: I think you received it, didn't you?

McL: No, I never had one. I was a Sheldon Fellow--but the John Harvard scholarships go only to the college. I was never in Harvard College--except as a teacher.

But I know that point was discussed, and I don't know just how it's administered now. That was felt to be a very good provision. We wanted it to be regarded as an honor, but we didn't want to deny a young person, perhaps from a wealthy family, who was brilliant, the chance to have this honor.

Committee on Educational Policy

McL: There was another committee of the Regents that was important. 'Way back in the Sproul period I proposed that the Regents should have a Committee on Educational Policy. Do you know that the Regents had never had a Committee on Educational Policy?

N: It seems incredible.

McL: Isn't it? I proposed that each campus should have an academic plan established as to what its major objectives should be. Bob Sproul thought that was a fine idea, and arranged to have academic committees consider it. My feeling at that time was that academic plans should be developed for each campus that would serve as guides for growth, and indicate where emphasis should be placed and unnecessary duplication avoided.

There was general agreement that each campus should have its distinctive quality. That has, I think, been achieved fairly well, but perhaps not to the degree I had had in mind at the start. I rather thought we might be able to keep Santa Barbara and Riverside primarily as undergraduate institutions, excellent colleges such as Amherst or Williams, but not try to make complete universities out of them. I think it was a fine idea to have people at those institutions who were primarily teachers and whose advancement was not tied to research to the same degree as it is on the older campuses. Well, it didn't work.

Academic standards perhaps wisely are more or less uniform throughout the University and, as all academic appointments are rightly in the hands of the faculty, a man whose career was based largely on teaching was apt to find himself by-passed. It would have been a dead-end, I am afraid, for anybody to become a member of a college-type faculty if that required him to be primarily a

McL: teacher and neglect research or scholarship. Riverside made a splendid start in that direction, but now Riverside, Santa Barbara and Davis, as well as the new campuses, are all on the way to become full-fledged Universities. I suppose this was inevitable, but I thought that a couple of the campuses could have attained more distinction as colleges.

N: It sounds very appealing.

McL: It was, at least to me. But it was still possible for each campus to have its own character. I felt, for example, that while Davis ought to continue to emphasize broad intellectual interests it could relate them in some subtle way to what was then its most distinguished field--agriculture. Well agriculture has drifted into a less dominant position now, I suppose, than it had then, and Davis has become a full-fledged, all-around University. I think, however, that distinctions of this sort would have been good to preserve somewhat more fully than they have been. Perhaps they would have made some of the campuses seem more "relevant," to use that awful word.

Out of it came the Committee on Educational Policy, and I was the first chairman of it.

N: Oh, yes. Now Miss Woolman has indicated--is this correct?--that you were chairman of the educational policy committee July 1953 to June 30, 1956 and again from July 1, 1956 to March 1, 1966.

McL: Yes. It was great fun getting that committee started. I was the first chairman; then Ed Carter became chairman when I was Chairman of the Board. Mrs. Heller tells me that now this is the committee everybody wants to be on--more list it as their first choice than any other--even finance. [Laughter]

N: Look what you started: an interest in education, of all things. [Laughter]

McL: Yes! Rather an intrusion on the part of the Regents. Grounds and Buildings was another one of my interests, and in those days Grounds and Buildings was a very important committee too, for a while. I was chairman of that at times. But that's not nearly as important a committee now, because there is so little money available for new buildings. [Laughter] The great building period, I am afraid, is over.

But I had lots of fun being on that committee while it lasted, especially for the chance it gave me to bait the architects! [Laughter]

N: To go back again a moment to the educational policy committee, since it is really so central, according to the academic plan that you

N: had hoped each campus would produce, was this a matter of emphasis?

McL: Yes, it would be a matter of emphasis. Academic plans were eventually worked up for each campus and I think a proper degree of distinction between them was maintained. It took a lot of study on the part of devoted people. At the start, I remember writing Bob Sproul and expressing some of my own ideas. Of course, after the various faculty committees got really into the question, there wasn't too much resemblance in the final reports to the suggestions that I'd made. But it was important to start some thinking along such lines. Campus plans, in a broad sense, could have been established, I suppose, as matters of regential policy. For example, final decisions on questions such as which campuses should have medical schools, or law schools, or what broad fields should be emphasized, are largely the responsibility of the Regents. The Regents too have to consider ways and means of providing the necessary facilities--buildings, scale of faculty, laboratories, etc.--but one could hardly imagine reaching decisions on such matters without careful study and recommendations from the faculty and the administration.

If we had continued to maintain Riverside as it was then--really a very distinguished college, rather than a University--it might have been quite successful on that basis. As a matter of fact, the youngish faculty there at that time rather liked the idea and there was a good deal of reluctance expressed about expanding it to a University with graduate schools.

But it was felt that the demands of California were going to be such that we would have to have additional units of the University in each one of those places, conveniently distributed with respect to the population. So each new campus was planned as a University in itself. My fear was that we might end up with some of them being inferior universities when a few might have been outstandingly good undergraduate colleges. I really still think there are some grounds for such fears and even more so when some of the state colleges try to imitate universities and neglect their most important function, which should be teaching on the undergraduate level. But the way it has all worked out is not too bad. Each has its own quality and special strength. And each campus has its own distinctive appeal to discerning students.

N: Was one big problem the fear on the part of the Academic Senate that they might be losing some of their control over educational policy if the Regents moved into this realm?

McL: I don't think so. There really was never a conflict. The Regents welcomed the plans submitted that were worked up by faculty committees and the administrative staff and presented by the President. There was lengthy discussion and constructive debate--and we all

McL: had a chance to express our views and prejudices. It was, of course, recognized that we weren't trying to set up rigid plans for all time. But they did guide us in our decisions, particularly with regard to the new campuses--and all in all the plans were a very good exercise for all concerned.

N: I see. So really your function was to stimulate or to request concepts from the faculty.

McL: That is really what it amounted to. I suppose it would have been within the power of the Regents to say, "In principle we feel that we should have certain undergraduate colleges--campuses that are primarily undergraduate," and designate them. I'm sure, however, that the Regents would not have gone along with any such plan without strong faculty support. But such ideas were never formally proposed though they were talked about a bit. Perhaps there were a good many at Riverside who would have been pleased with such a pattern. For a while they might have handled it successfully, for it was a young faculty and enthusiastic about the college aspect of the campus. But perhaps they hadn't quite realized how much their promotions depended on scholarship and research.

N: Unless there would be some parallel system.

McL: A young man really couldn't spend more than a few years on the faculty on such a campus without running into a dead end--at least under current procedures. If he stayed too long, he would find it difficult to transfer without having achieved the scholarly standing the older campus would insist upon. But a lot of the young faculty really had a wonderful time down there in the early years.

N: I would imagine it would be very exciting for the students to feel that here was a faculty that really cared about the teaching.

McL: I think Riverside was at its best in those days. It really attained excellent standing as a college.

N: As you've described the different emphases in building up universities, the building up of the faculty and the building up of the physical plant, the architecture and so on, now does there seem to be a return to interest in educational policy?

McL: Well, I think there is. It's a difficult committee in the sense that it needs to be handled with a good deal of tact so that you don't get involved in trying to push educational policies on the faculty. The faculty feels it's their prerogative, very definitely, but I'm sure there are broad questions that are very proper for the regential committee. I think that that question of distinction between the different campuses and emphasis at different campuses, was one in which the Regents might have been more forceful than they were--if they

McL: had cared to be.

But they didn't then, and it was probably just as well. If the faculty thought the Regents were trying to put over any pet schemes of their own and violating prerogatives of the faculty, it could have been troublesome. Most faculty members are extremely conservative about anything that touches them personally! [Laughter]

N: Yes. That's a nice distinction.

McL: Very liberal with other people's affairs, but they're very, very conservative with regard to their own.

N: This suggests perhaps that the Regents' committee could be perhaps stimulating and supportive.

McL: Yes, and by and large I think the Regents' committee has functioned well. Ed Carter was deeply interested in that committee and did a fine job on it. Ellie Heller's chairman now. She is a great Regent, and a most discerning and tactful person, with a very keen understanding of the academic world and of cultural matters. By and large it's been a good committee--it's been a very exciting committee to serve on.

N: I take it that committee has to attempt to reconcile financial problems and demands for new kinds of training?

McL: No committee, really, is independent of others. The financial decisions are in the hands of the finance committee, but very often the two committees would meet jointly in relation to priorities. The educational policy committee would say, "This is the policy, this is what ought to be done." The finance committee would discuss it in relation to other University requirements--where the money's coming from, and so on.

Let's say: should money be provided for an entirely new law school or should existing law schools be given stronger financial support? That would be a matter that would be considered by the finance committee as well as by the educational policy committee and perhaps even by buildings and grounds.

N: It makes educational policy sound very central...

McL: It has become very central, though for a time it was a new committee and the finance committee for years was the dominant committee--almost an executive committee. Neylan had had the chairmanship of the finance committee for a good many years, but toward the end of the oath controversy the Committee on Committees refused to select him for it. He was not best pleased! [Laughter] It was a very

McL: hot meeting! And not the most enjoyable.

There are other committees--even sometimes buildings and grounds is dragged into these questions, too, to determine what could be done.

N: Is it your impression that there will eventually be more University of California campuses?

McL: I would doubt it. There was at one time a discussion of having a University campus in the San Joaquin Valley, and I don't hear much about that now. I really think that with the expansion of the state college system that it's unlikely there'll be more campuses of the University of California.

The idea I like would be to strengthen the quality of the University of California, and restrain its growth; and to let the state colleges be the institutions that would meet the general pressures of population. The state colleges ought to be excellent undergraduate colleges and not second-rate universities, but they all seemed to be enamored with becoming universities.

N: They are pressing to award the doctorate.

McL: Yes. Of course if that happens the doctor's degree is likely to become a much less valued degree. What's the verse, "When cloth of gold is thirty cents, up goes the price of shoddy." [Laughter]

N: Very good. Does it seem that the University has more than its share of troubles these days?

Alienation and the Free Speech Movement (1964-1965)

McL: The academic world doesn't realize today how alienated it is from the general mass of the people.

N: Do you feel that the fault lies with the academic world itself?

McL: Well I think it does to a very great degree; for example, the way the faculty supported the so-called Free Speech Movement made an extremely bad impression. That is, when you say "the academic world" you mean a little group of noisy activists in it. They supported the FSM and they've encouraged the very radical and irresponsible element among the students. There was no solid front on the part of the faculty against the rioting. We know many professors were rather sympathetic, even though the objectives were so vaguely defined, and some were so senseless. That goes on all over the country, however. The Univer-

McL: sity's status with the people of California is awfully low at the moment--but other institutions are also suffering in the eyes of their former friends. I don't think many academics realize how serious it is. I do, being outside now. The people of California were so proud of the University. Money came so easily; the Legislature was generous, year after year. I don't remember when I was on the Board of Regents ever having our budgets seriously cut in Sacramento, and now, you couldn't get a bond issue through for the University today. Well, we hope we'll get this bond issue through for the medical schools.

N: Is that Proposition One? [On the ballot in June 1970]

McL: Yes. That's for the medical schools, and that has special appeal. But if you put it up for the University, oh dear! For the University, in general, it might be very disheartening. I hope I wasn't on the air. [recorded on tape]

N: You were on the air, but you have a blue pencil that you can use when you see this transcribed. Actually I hope some of your opinions, or all of them, really, will be left in, because this will capture what is being thought at the moment. These views are lost if someone isn't discussing them. I think this certainly is relevant. After all, you have every right to speak about the University, and about this period.

McL: We all loved the University so much,it's just terribly disturbing to see it get into such a situation of antagonism with so many of its former friends. I am afraid that this is reflected in the attitude of a good many in the Legislature and perhaps even the governor, who are apt to listen to the electorate.

N: Many of the faculty, of course, did not go along with the rioters, but even if none of the faculty had gone along with them, would it have made any difference?

McL: I think that if the faculty leadership had taken a strong, indignant stand against the rioting, saying, "This is intolerable. We cannot have things of this sort in the University," and backed up the administration strongly, it would have made all the difference in the world. Right at the beginning in the FSM, that's when things got out of control. Terribly. And it's just escalated from there to other Universities, and so forth.

N: I don't know whether one could say that the faculty exerted leadership for the rioting, particularly. I have the feeling--do you--that the leadership arises elsewhere?

McL: Oh, I was not implying that the faculty exerted leadership in the

McL: rioting, but merely expressing my dismay that the faculty--or more than a few on the faculty--didn't become indignant about the illegal and outrageous things that were being done and take an aggressive stand against them. Quite the contrary happened, if you remember at that famous session in the midst of the FSM riots, when the faculty met and had their discussions broadcast to the mob outside--and listened to the noisy demands its leaders were making. The faculty practically endorsed the demands of the mob, which I think was a shocking thing to do and it shocked a lot of people who vote in California. That was a moment when the faculty might have taken a strong stand against the disorders that would have made it a lot easier for the administration to deal with them. But they failed to, and made matters worse by practically supporting the radicals. Of course, we all know what a small fraction of the faculty usually attend Academic Senate meetings--and how few remain toward the close when votes on controversial issues are apt to be taken.

N: Yes, they can scarcely get a quorum most of the time.

McL: I think there was, that time, an unusually big crowd, but at the same time, the people who speak, the emotional people, are nine-tenths on the extreme left side. I've gone to a few meetings since I've been a professor emeritus, and I have not been impressed with the quality of the debate, or the balance that you find in a group of highly intellectual people.

N: How do you account for the silence on the part of others?

McL: I don't know. I think for the most part they're gentle, scholarly people, and they don't like rough debate. But the debates I've heard, have been more like the acrimonious debates you have when you're in labor negotiations than in a faculty meeting. Except that in labor negotiations everybody knows whose side they are on, and they're friendly enough afterwards! [Laughter]

N: I see. This way you're not friendly at any time, I gather.

McL: Well, we'll see what happens today. It's going to be a pretty dreadful day. I hope things don't break loose too much at Yale. But how an intellectual institution can stand up and defend these murderers among the Black Panthers--some of them are confessed murderers--and say they can't get justice, is beyond me! They're the ones who are preventing justice by creating all this heckling in the courts. If you'd have a fair, orderly trial before a jury, they'd get justice, I'm sure. They could have justice. But the people who are obstructing justice are these wild people; time after time it's worked that way. Now to have a man high in the academic world come out and say that the Panthers can't get justice--this is just incredible to me.

N: There does seem to have been an interesting shift in the matter of

N: who needs protection in the courts. It used to be that the accused did. I've been reading, occasionally, some articles to the effect that it is now really the judge and the judicial process that need protection.

Student Violence

McL: Yes. Well I think this is a deliberately planned technique on the part of a group of very skilled, more or less professional revolutionists, and they're quite successful in accomplishing their ends. The students are one of the easiest groups they can influence. I think this same group--the extreme left revolutionary group--tried to take over the labor unions some ten or twenty years ago, but they really did not get very far. The laboring man, basically, is pretty conservative when it comes to that sort of thing.

Now I think there's the same attempt being made to take over the Universities by organizing student violence. It's an old technique. It's the Latin-American technique. I've seen it for 50 years in Latin-America. Revolutions are started among the students, but generally to serve the ends of others who are simply using them.

N: In Peru, also?

McL: Oh, yes. Little groups get them organized, and you can get a mob of students raging on the streets very easily. Then the group that wants to manipulate them, manipulates them.

Not very long ago, you know, the University of Mexico was shut down for a long time by being taken over by mobs, and we had a feeling that that could never happen here in America. Yet it's happened, and it's grown unbelievably. I didn't think our students were so stupid, but they are. They're easily taken in. I didn't think that that many on the faculty could be so stupid--except the few devoted radicals who are by no means stupid. There again, there's a little hard core of them, I'm sure, that are really devoted revolutionists. It will be a dreadful thing if they succeed. I don't think they will, however, for the interest of students in causes is apt to be short-lived--and even the faculty gets bored or possibly ashamed.

If it goes too far, and I think we are well on our way now, it is so likely to split up into a really harsh conflict between such left-wing revolutionists and the equally obnoxious extremist groups on the other side--the fascist, Nazi, extreme anti-Communist type. That's the pattern.

N: They do need each other, don't they?

McL: Oh, yes. They're both interested in power. I don't think ideas count very much. It's power they're after. Before one or the other gets power, there could be a terrible fight. I hope that's not going to happen, but the moderates are going to have to wake up. They're going to have to do more than just stand and have rocks thrown at them.

N: I suppose, as you suggested, it does come down to the question of leadership.

McL: Yes. It really does and so far I don't think our big, moderate group has had the aggressive leadership that is needed. Of course, there have been some outstanding figures. I couldn't admire anybody more than I do Roger Heyns. Perhaps his low-keyed attitude was the right way to deal with the explosive situations he had to face. It seems to have succeeded. At times--especially when Wheeler Auditorium was burned and the attempt was made to set fire to the Library--a wave of indignation might have been built up that would have been salutary. It may take, however, leadership of a more dramatic and aggressive quality than we are apt to have in the academic world--or like very much if we had it. Probably if I had been in Roger's position, I might have tried to be tougher and fallen on my face.

N: Perhaps it will have to be a political leader, do you think?

McL: Well, I don't know.

N: Where do you suspect the leadership might come from?

McL: I don't know. It's hard to say where you'd find them. You'd think they could come from the faculty ranks; you'd think there'd be somebody, or somebody emerging from the faculty ranks who would have that quality. I must say, I haven't seen that quality of leadership among the few conservatives in the faculty group either. You know them, as well as I do. They're not really wise men and they don't really command any following, or show much ability to criticize constructively.

N: Do you suppose it would have to be someone who is going to deal with, let's say, the inequities in society also, since this seems to be part of the fuel for the debate?

McL: I think that would be part of the ploy, but I think the inequities of the society really don't concern most of these people. They're after power and they'll jump from one thing to another. They started with free speech, which was a completely phony issue if there ever was one; there's been no institution freer than this, really--just arguing about whether you could use one particular place. There was

McL: no question they could do all the free talking on the campus they wanted, but they couldn't whenever, wherever and in whatever manner they wanted. They merely had to respect those in authority who were responsible for the rights of everyone on the campus. And then Vietnam gave them just what they wanted. That let them tie into the ROTC, which is just as phony an issue, almost, as free speech. The majority of students want ROTC--they voted for it even at Stanford. They haven't had a vote here, but the faculty is supporting ROTC. But here's a place where you can rally opposition.

N: This curious aspect of not really any longer believing in free speech...

McL: No. In the very first movement, Ed Strong was heckled, shouted down. In the first University meeting, when that thing was starting--when they were shouting for free speech--they interrupted him and wouldn't allow him to make a speech--just think how shocking that was. Could anybody be a more liberal, fair-minded person than Ed Strong?

N: No. Exactly.

McL: There was no chance allowed to state a case, to give both sides, and really provide good intellectual debate on the issues such as they were.

N: Thinking back over the many people you have known, both in industrial and academic fields, can you think of someone who seemed to be a leader with the requisite qualities?

McL: If we go back, Bob Sproul had it, a leader. I think in an emergency with his presence, and his voice, and his manner, he could have probably played a very dramatic and very effective part, if he'd been the Bob Sproul of twenty-five years ago. I think of all the people I've known in the academic world in high positions, he had that quality of leadership.

Of the other presidents I've know, Lowell had great qualities of leadership, but not that sort. He was a rather arrogant intellectual, and he ran things smoothly, generally just as he wanted. [Laughter]

N: Where was he?

McL: That's Harvard. Conant, whom I knew much better than Lowell, was, I think, an even greater intellectual than Lowell--of course he was a scientist, which gave him higher status in my eyes. He could be a very firm person, but not one to tell people off the way Lowell could, [laughter] or to take command of an unruly situation in the dramatic way that Bob Sproul could.

The Loyalty Oath (1949-1952)

N: Of course, President Sproul too had his troubles with the Loyalty Oath.

McL: Perhaps everyone is entitled to a few big mistakes. This one was really a major one--but in the end he survived. Bob made a terrible blunder in following advice given him, that a loyalty oath would be a good thing, vis-à-vis Sacramento, to show the Legislature that University professors were normal patriotic Americans and all behind the country. It was sad that Sproul went along with that advice. It almost wrecked him.

N: Yes. Was that Mr. Neylan who....

McL: No, it wasn't Neylan. It was probably Jim Corley's advice and given with the best of intentions.

N: Oh, I see. Yes, I see the Sacramento connection.

McL: I'm sure it was all done with the greatest good faith, in the sense that they were convinced that such a gesture would be a fine thing for the University vis-à-vis the Legislators. There was no understanding of what it would mean to some members of the faculty. I was particularly surprised that Bob Sproul didn't realize how deeply many felt about such a procedure. I don't think he paid much attention to it in the early stages.

N: No. An odd lack of sensitivity, perhaps.

McL: He must have been preoccupied with other things, because he knew the faculty awfully well, but it just caught him off base. Then a whole series of unfortunate mishaps occurred--misunderstandings, reversals of position, emotional and extreme statements--that led to intense antagonism between members of the board, and particularly between Sproul and Jack Neylan. Strangely enough, in public life Neylan had generally been on the liberal side in various controversies. But he became incensed with what he alleged were misstatements by the President and certain faculty officers; and when he moved in with the aggressive and antagonistic manner of a prosecuting attorney, I must say he became very offensive, even at times when he was right.

N: Was he the attorney for the Hearst family?

McL: He was the attorney of W. R. Hearst for years, and he had been in Sacramento, you know. He held a high appointive post in Sacramento for quite a while. So he was experienced in politics in Sacramento, and by and large from his general career and his interests, he'd been very much on the liberal side of things. But something occurred (and

McL: of course this is all written up) that made him feel he'd been double-crossed in some way, and he became intensely antagonistic to Sproul. It was a bitter time on the Regents' board. I came in right in the midst of it.

N: Yes, you were right there during a large part of this. Did you come in with any preconceived views about the wisdom of the oath?

McL: I was on the alumni committee that was appointed by the president of the Alumni Association with Steve Bechtel as chairman. The committee worked up what most of the members thought was a reasonable compromise, and the report was accepted by both the Regents and the Academic Senate with rather general approval. That little plaque up there [gesturing] was one the Alumni Association gave me for being on that committee.

We went to see all sorts of people. We called on Neylan several times and talked at great length. I'd known him a long time. We went to see Mario Giannini at Palm Springs, where he was resting, and we talked to all the Regents.

I know Steve Bechtel was most anxious to try to find some solution that would get the University out of this, to all of us, damaging and futile row. If I'd been on the faculty, I would have taken the oath without any hesitation, for I regarded it merely as an expression of loyalty to our country in a time of stress. There was really no reason to think that it was a plot against the freedom of the faculty, though toward the end issues of faculty rights, academic freedom and tenure became almost more critical considerations that the propriety and legality of the oath itself. It was a poor way to implement the University's anti-Communist policy. It was a silly technique anyway, for it just was the sort of thing that was terribly disturbing to a number of idealistic people who were by no means Communist sympathizers. To punish them for their unwillingness simply to conform to an order of the Regents to take an oath was perfectly outrageous. So I--a conservative--was on the side of the liberals in this controversy.

Neylan, who in many ways was considerably more liberally inclined than I am, was fighting the professors. It was a strange, mixed-up thing. However, I don't think it did the University nearly the harm that the people who were emotionally aroused felt that it did, one way or the other. But it was a rather dramatic time. Then the alumni committee came up with a statement that they thought everybody could get along with. And indeed, both the Regents and the Academic Senate accepted it with a measure of relief. Unfortunately, it developed that even members of the committee weren't in agreement on the interpretation of its major provisions and the Regents also were divided with regard to just what was intended.

McL: It tried to set up a procedure whereby a professor who was unwilling to sign the oath could have his case reviewed by the Senate Committee on Privilege and Tenure. It was my understanding--and this was shared by Mrs. Fletcher (a member of the alumni committee)--that if the Senate Committee was satisfied with the reasons he advanced and convinced that he was in fact not a Communist, that it would recommend that he be excused from taking the oath and the President and Regents would accept this recommendation. A small, but prevailing majority of the Board at that time, however, restricted the reasons acceptable for waiving the oath requirement to what amounted to conscientious objections to oaths in general. As it developed, the Regents by a narrow majority adopted a procedure that resembled the old concept of giving a man a fair trial and hanging him anyway. That was not the spirit of the alumni proposal, as I understood it, but neither the Regents nor the alumni committee itself were too clear about what it did mean. [Laughter] And it didn't work.

The Regents listened to the report of the President based on the recommendations of the Committee on Privilege and Tenure and proceeded to disregard his advice and fire a group of the non-signers that the Senate Committee had cleared.

N: So that proposal was never implemented?

McL: It was implemented in an unfortunate way, but it did not work out the way two or three of us on the alumni committee thought it was going to work.

N: Was Dan Koshland on this committee with you?

McL: I don't think Dan was on it. He was on another committee of alumni, but not the committee set up by the Alumni Council. That committee consisted of Stephen D. Bechtel, Chairman, Paul Davies, Milton H. Esberg, Jr., Katherine Fletcher, and myself. John Simpson was an advisor, and Stanley E. McCaffrey was secretary.

N: Yes. You know there is a recent book on the Oath, David P. Gardner's book, The California Oath Controversy, University of California Press, 1967.

McL: Yes. He should have sent me a copy of that, but he didn't. [Laughter] Because he came to see me about it, and he sent it to practically everybody else on the Board, but I think I was just overlooked. Anyway, I am going to get one and read it.

I hear it's quite a well-balanced story.

N: I had that impression from the parts that I read, that he did attempt to find the facts.

McL: The way the controversy was settled, really, was--Jesse Steinhart played a big part in this--by substituting for the Regents' oath a new state oath with similar intent that had recently been enacted by the Legislature. It was known as the Levering Act. It required all employees of the State of California to take what amounted to an oath along the same lines as the Regents' oath. While we could have quibbled that the University faculties are under the Regents, not under the state government, therefore they would be exempt from the oath established by the Legislature, we didn't raise the issue and neither did the faculty.

It was subsequently established by the Court that it did apply to the employees of the Regents, including the faculty. So it was proposed to rescind the Regents' oath. I think I made the motion to rescind the Regents' oath and to make the Levering Oath a requirement for employment. I remember when I telephoned the form of the motion to Marjorie Woolman and asked her to put it on the agenda, she seemed to gasp and commented that this was really pretty direct action or something to that effect.

I'm oversimplifying a complex procedure, but that was essentially what happened. The state oath wasn't popular, but since it was imposed by the government and not by the Regents, all members of the faculty acquiesced and took it, probably with a shrug or two in some cases. But no one made a big issues about it.

Everybody on the Harvard faculty had to take a similar oath imposed by the Commonwealth of Massachusetts. Many didn't like it, but no one refused to take it.

N: Yes, I do remember the argument that faculty members hated being singled out. How did this solution suggest itself to you?

McL: Oh, I think it was Jesse Steinhart's good legal mind that saw this way through. Now Jesse was a thorough-going liberal, but awfully anxious to work out something that would resolve this situation. So that more or less terminated the oath row, with the exception of the lawsuit that was brought by the group of professors who had been discharged--which they won. They were reinstated with back pay.

N: And this was the one that Edward Tolman worked on.

McL: Yes. Tolman was really the leader of the hard core of non-signers.

So with the winning of that lawsuit by the professors, the situation came to an end. Until recently every employee, including faculty members, had to take the state oath. But, as I understand it, the Supreme Court has ruled that even an oath of this sort was unconstitutional and it has been withdrawn. And in spite of it all,

McL: the University has survived and prospered.

The whole thing is so silly because a Communist, or an extreme revolutionist, wouldn't mind taking a dozen oaths. What can you do? You can't try them successfully for perjury, or impose any penalties on them. Look at this girl from Southern California--what's her name?

N: Angela Davis?

McL: Angela Davis. I suppose she's taken the oath. No, I guess now she doesn't have to. After she was appointed, she announced she was a card-carrying member of the [Communist] Party, which violated the existing rules of the Regents--endorsed by the faculty--that membership in an organization that required and enforced acceptance of its doctrines was incompatible with academic freedom and made such a person unacceptable as a faculty member, or words to that effect. She has appealed to the courts, and Lord knows how it will turn out. In my judgment, the Regents' rule is quite proper, but I wouldn't want to bet on the outcome.

I'm sure there have been Communists on the faculty who would never admit it. I think in almost any association you'll find people like that. It's not just the faculty. With the emotionalism about the Blacks now, and the general sweep of disturbances, and the so-called liberal doctrines that are popular now--extreme liberalism I would call them--why I think they will make a major issue of this case. "Let's run this into the courts--make a case out of it." Lord knows, she's had plenty of support, had one favorable decision from a lower court judge. Of course the case will probably go much higher.

N: As you touch on various controversies, it sometimes seems that there's so much heat over what is really perhaps not a central issue.

McL: But now and then what would seem to us to be a non-essential issue can be blown up into something that becomes a very great emotional controversy, capable of creating enormous disturbances, such as the free speech movement.

N: Yes; that had so many other elements involved it's hard to separate them out.

VI THE HARVARD YEARS

Faculty Members and Colleagues

N: Now shall we turn back again to your own student days?

McL: After graduating from the University of California I was at Harvard for three years. I was there doing graduate work in geology, and took my Ph.D. in 1917. It was a very happy three years. In geology I had some unusual opportunities, including going to Alaska my first summer at Harvard: a very interesting job.

I got a good paper out of it with Alan Bateman, then an instructor at Yale. He later became a professor at Yale and was a lifelong friend of mine. We spent most of the season at Kennecott in the Copper River basin where two important and very profitable copper mines had just been started. The ore there was fabulously rich in copper. Nothing quite like those deposits has ever been found since; the ore was so very high grade. There was one big stope that ran almost 60 percent copper across 40 feet--solid crystalline black chalcocite. By way of contrast most of the copper ore mined today in the United States averages less than 0.75 percent.

The Kennecott deposits were in spectacular country. The mines were high on the flank of a sharp ridge that was a spur descending from Mt. Blackburn, a 16,000-foot peak, one of the highest in the Wrangell Mountains. A geologist had to be an Alpinist to get around.

At Harvard there were two Californians on the faculty: Charles Palache, who was one of the great mineralogists of the age, was already there when I was a student. Later Esper Larsen was a colleague when I was on the faculty. Both of them were Ph.D.'s from Berkeley. Larsen's field was petrology. Both of them were wonderful people, wonderful scientists; Palache was an extraordinary teacher, a good lecturer as well as a brilliant scientist. Larsen was a great

McL: teacher too, but only in the laboratory around a microscope. He was really a perfectly impossible lecturer [laughter]. But he was a great teacher, and produced an extraordinary number of outstanding young scientists in his field. A very great man himself.

My closest friend, both as a teacher and later as a colleague, was Louis Caryl Graton. His father was a Canadian. He graduated from Cornell University. He's still living, and the University of California at Riverside gave him an honorary degree a few years ago. (Note: L. C. Graton died on July 22, 1970. I prepared a memorial for him that was published by the Geological Society of America in November 1971.)

I may have instigated the award a little bit, but Regents are not supposed ever to propose honorary degrees [laughter]. They are initiated by the faculty. As a matter of fact, one of Graton's former students and associates--George Tunell, a distinguished member of our faculty, who taught at UCLA and Riverside--was responsible.

N: Apparently the Regents also withhold degrees a little.

McL: They can withhold them, but they must be proposed by the faculty and recommended by the chancellor and President to the Regents. The Regents, of course, get many recommendations, more recommendations than the degrees they will grant, so there are always some degrees, or rather some recommendations, that are not approved. But those discussions should always be highly confidential so that nobody would be embarrassed by having his name presented and not approved.

I remember, I think, one time Sukarno's name was suggested. I don't know whether that came through officially or not, but it was certainly mentioned. His name, fortunately, didn't attract any enthusiastic support. How lucky it was. That was when Sukarno was a great liberal!

N: Yes. That's spooky, isn't it? [Laughter]

McL: Yes, so the Regents sometimes show some wisdom. In the case of [Mayor John] Lindsay [of New York], the Regents shouldn't have turned him down for a degree after he had been approved as the Charter Day speaker. They'd had an opportunity to disapprove of his selection as a Charter Day speaker. Those speakers are always reviewed and discussed at the Regents' meetings. It's just one of those things that shouldn't be done.

N: It seems especially inept.

McL: Oh, I think you should never have any despair about the Regents because no matter how ill-informed a man who has just been appointed

McL: may be about the University, he will learn. Sometimes people who seem to be very ill-prepared to be Regents turn out to be good Regents, time and time again. Just as they gain experience.

N: There's that to be said for the long term, certainly.

McL: I think there's a great deal to be said for the long term. Even a person whose knowledge of the University is just about zero at the start, soon realizes what the University is and gains great respect for the way it works and for the people involved.

N: This happens on the Supreme Court too, I suppose. [Laughter]

McL: Happens the other way sometimes!

Well, to go back to Harvard, it was an interesting time there. My roommate was Ralph Eaton; he was my roommate for two years. He'd been Editor of the Daily Californian in 1914. A brilliant fellow who took his Ph.D. in Philosophy and then became a professor at Harvard, in philosophy. He had quite a tough time in the war, too, but fortunately wasn't wounded.

And another friend on the campus then--or the Yard for Harvard, you don't call it the campus--was Sidney Howard, the playwright. Benjamin Webb Wheeler--Benny Wheeler, President Wheeler's son--was there at the same time. There was quite an interesting group of Californians around then. Earl Fenston (née Fenstermacher) who later became a Regent, was in the Law School one of the years. Nelson Hackett was also in the Law School and Sam Hume was in Cambridge for a while. Rather an entertaining group, but with so many different interests and personalities that we were rarely together as a group.

N: After coming from Berkeley and then going to Harvard, what struck you as being different, or stimulating, if it was, about Harvard?

McL: I was always, at that age particularly, I think, influenced by the feeling of a city--the geographical feeling, the difference of climate. For one with my background--with our California Mediterranean climate with its wet season and dry season--it was a great change to live in the East with its totally different seasons; lovely autumns and then cold, disagreeable winters, monotonous, long early springs with a burst of flowers at the end. I had been in the east before a good deal, but I found it all very novel. I have never liked the eastern humid hot summers, but fortunately there was always something that took me west or elsewhere at that time of year.

I think, as I look back at it, as far as undergraduates were concerned at Harvard, in those days you saw more students who had both the advantages and disadvantages of wealth, compared with the

McL: Berkeley campus. At Berkeley people were--well, there was a small wealthy group that played around a good deal, but the general rank and file was much less well-heeled than the Harvard group. Though that wasn't so true of the graduate students at Harvard.

I had some unusual opportunities there because I'd met so many Harvard faculty people at Pleasanton at Mrs. Hearst's, and they were all extremely nice to me. Graduate students always like to be fed, so I enjoyed many good dinners with those kind friends. I had a very nice introduction to both Cambridge and Boston that way.

But all in all it was a very serious time with a lot of intensive work. You see, 1914 was the year war broke out, so these were war years though we weren't in it. I got my degree in '17 just when we were getting into the war. Sidney Howard joined the American Ambulance Service that spring and I remember going to the South Station to see him off on the train for New York on his way to Europe on the night of the Battle of Jutland. The ominous first news of the great battle was then coming in and it was pretty depressing, for at that moment it was uncertain how it was going to turn out. Sidney left that night and I didn't see him again until I got on a steamer in Brest at the end of the war when we were both on our way home. In the meantime, of course, he'd become a distinguished flyer, though I don't think he had become an ace.

Another old friend, Douglas Campbell, son of President Campbell, was, I think, the first American ace. He was wounded fairly early in the war, and it wasn't long after that Eddie Rickenbacher--who later became a friend of mine--far surpassed his record of German planes shot down.

Howard left the American Ambulance Service and went into the air corps, whatever it was called then. I didn't know whether he was alive or dead until I met him on this steamer. He was coming down from another port on the New Amsterdam, a Holland-American liner and a neutral, on which some of us had the good luck to be shipped home. A well-stocked bar and a flock of attractive nurses also on their way home made it a memorable trip.

A Fellowship Award

N: There were just one or two more questions about Harvard. I see that in 1916 you were a Frederick Sheldon Travelling Fellow; do you recall this?

McL: Oh, yes. Harvard has some fellowships--supported by an endowment--

McL: which grant money for travel. Supposed to be something like the Fulbrights today. But European travel was cut off, so I got a Sheldon Fellowship which paid part of my expenses--more or less supplemented them--for travelling in the United States to visit a number of different mining camps where certain ores I was interested in were to be seen. It was a rather small amount of money, and the chief thing was the honor of having that appointment.

N: Yes, I'm sure it means something in an academic career. And I have a note, too, that you did a little teaching of geology at Harvard.

McL: Yes, in my second year of graduate work I was an assistant--it'd be a "T.A." now. That was in R. A. Daly's course, which then was the famous Geology 4 at Harvard; I don't know what they call it now. He was a wonderful scientist and a great teacher, and it was a very interesting experience and very helpful too. I think I gained a lot out of being a teaching assistant.

N: What did you learn about teaching while you were doing that?

McL: At Harvard the lectures in geology were supplemented by laboratory instruction and field trips, all rather well coordinated with a lot of rocks and minerals and maps to study, as well as some structural problems. There were, then as now, surprisingly few directions given to assistants. They were just thrown into the water and told to swim. The system may be better now, but it seemed to work pretty well and was good training for the assistants, even though the poor undergraduates may have suffered.

It seemed necessary to do a lot of explaining, almost giving little laboratory lectures to the students, or clarifying what the learned professor was trying to tell them. I found it a very interesting experience. Strangely enough, in later years I've run up against a number of the students who were in those laboratory sessions. One of them was U. S. Grant, IV. We used to call him "Useless Grant." [Laughter] He was a nice boy, and he became a very dignified Professor of Geology at U.C.L.A. I remember Clark Kerr at a Regents' meeting saying there was an elderly professor, retired for some years, who was leaving his library to the University, and hoped somebody'd move to accept it. I moved to accept it, and said, "I resent hearing a student of mine referred to as an 'elderly professor!'" [Laughter] A former student. And that was about 15 years ago! [Laughter]

N: Some people age faster than others! [Laughter]

McL: I am afraid so. He was an attractive fellow, and a very able geologist, and still is.

Copper Mines and Summer Jobs

N: Now, before the war, you had a summer in the field, didn't you?

McL: Yes, there were two different summers, in '15 and '16.

N: Thinking of Alaska, can you tell a little more about the Alaska mines?

McL: The group that had that property, the Kennecott Company's mines in the Copper River area of Alaska, used the fabulous profits from it to regain control of the Utah Copper Company that operated the first great open pit mine, which is at Bingham Canyon, near Salt Lake City. It was developed by Daniel C. Jackling. He was the engineer who conceived the idea of mining a relatively low grade type of deposit we now call a porphyry copper, mining on a large scale in an open pit with power shovels, concentrating the sulphides disseminated through a great mass of rock and then smelting the concentrates. That was a great break-through in mining very, very much lower grade material than had ever been handled successfully before that time.

The ore was mined in an open pit with steam shovels in those days; now it's all electrified. But the pit is still going--it's one of the sights of the world, a tremendous hole. This huge operation--the mine, mills and smelter--is quite close to Salt Lake City--just across the valley; in fact you can almost see the pit from Salt Lake City. You must look for it sometime flying over it. It's on the south side as you come in, generally. You can see it in the distance. It's almost a Grand Canyon, it's so big now.

N: Were you associated with Utah?

McL: No, I had nothing to do with it, though I spent a week or so there with Graton in 1916. My short association with that company--it's now called the Kennecott Copper Corporation, which is one of the great copper companies of the world, was at the original Kennecott mine in Alaska in 1915. It was a fascinating place, 'way back in the Copper River country, which is about 150 miles or so from the coast. The copper deposits outcropped on a high ridge--a flank of the Wrangell Mountains. As I mentioned earlier, one peak, Mount Blackburn, rises to an elevation of 16,140 feet just north of the mine.

The mill was beside a six-mile wide glacier that was formed from two ice streams that descended from the great mountain. The mines were high on the eastern side of the glacier-filled valley, way up in rugged Alpine type country. They were connected with the mill by aerial tramways that brought the ore down. Everybody was

McL: forbidden to ride on the tramways, but we all did, in the small ore buckets. It was rather a terrifying experience, just sitting in an ore bucket riding over these terrific canyons and glaciers. That's all scrapped now. The two deposits that were mined were called the Bonanza and the Jumbo. They are presumably worked out. A railroad was built in from Cordova on Prince William Sound; it was one of the spectacular railroads of the age. Rex Beach's book, The Iron Trail, was about it. That's scrapped now, too, but you can fly in from Anchorage to a small town called McCarthy not far from the site of the Kennecott Mill. I almost did it last summer with my son George, but we didn't hit the right day. There's just one flight a week. But from flying very high over the St. Elias range on the way to Anchorage on a Western Airlines plane, I could identify Mount Blackburn country. It was really very exciting to see that country I had been in fifty-five years ago.

N: And you spoke about--was it the Wrangell Mountains?

McL: The mountains are called the Wrangell Range. It's one of the interior ranges of Alaska. The Copper River rises back there, then it cuts out to the ocean through the Chugatch Mountains to the coast, near Cordova. It's a large drainage basin and a huge river. You can still drive a little way up the Copper River on a road that is on the old railroad bed, but I doubt if the road goes farther than the Child's Glacier, where the railroad crossed the river on a spectacular bridge in front of a great ice cliff. It's fascinating country.

N: How did you happen to go to Alaska in the first place?

McL: Through my first association with Professor Graton. I took a course with him my first term at Harvard, and he offered me this job in the following summer. He had persuaded a group of copper mining companies to finance an investigation of the geologic process called secondary sulphide enrichment. By it, the copper content of an ore is increased by leaching of the metal from the superficial parts of the deposit and by its precipitation as the rich copper mineral chalcocite (cuprous sulphide) below the zone of weathering. Chalcocite has the highest copper content of any ore mineral, except native copper itself. The project was known as the Secondary Enrichment Investigation. A number of very able young scientists were employed on it and I was lucky to have been one of the very junior members.

The principal target for the study was the porphyry copper ore bodies that were enriched by the leaching or dissolving out of copper in their superficial portions and its redeposition on the leaner sulphides below. The result was the formation of a thick superficial layer of ore of somewhat higher grade in copper than the underlying material. Such ore bodies were generally overlain by a barren leached

McL: capping several hundred feet thick that had to be removed if the deposits were to be mined by open pit methods, or handled in other ways if the ore was to be mined in bulk by underground methods involving controlled caving. In depth the enriched sulphide ore graded downward into primary ore of lower copper content that fifty years ago was in most cases too lean to be mined profitably. Such deep ores are being mined today, however, but in the twenties the slightly higher grade portions of the deposits were all that were regarded as ore--and hence the interest in the processes by which the enrichment was brought about.

The first deposit of this sort that was developed into a very profitable mine was at Bingham Canyon--and Daniel C. Jackling, as I have mentioned, was the engineer who devised the procedures of mining and milling on an immense scale that resulted in costs per ton low enough to make the venture successful in spite of the relatively lean metal content of the ore. The general feeling in those days was that those mines could work only the portion of the ore body where there had been what we call secondary enrichment--enrichment from the surface.

Now most of them are out of that zone and mining the much lower stuff in depth that advancement in the techniques of mining and milling now makes profitable--as well as the relatively higher price of copper. That is, these secondary ores might be two percent copper, then you get into what is called the protore and that goes down to grades under one percent copper. Now in thses same great deposits they are working on the deeper ores, but back in 1915, it was thought that the only ones that had commercial importance were those that had a significant amount of enrichment--that is all they could mine profitably then.

The ores up in Alaska certainly, however, were not created by secondary enrichment, but the mineral chalcocite was the dominant mineral there, and as part of this investigation it was thought that we should make a study of these unique ore bodies. It seems rather strange that a study directed at the porphyry copper deposits--then and now the lowest grade ores mined--should have given me a chance to see the ore bodies at Kennecott that were so remarkably rich. At the end of the summer we spent there, we came up with some conflicting ideas. Graton and I disagreed about the origin of the Kennecott deposits and we had some hot sessions. I remember a long argument we had one night in my room in Conant Hall in Cambridge which ended with Graton leaving with the comment, "I don't see why the hell you ever studied geology anyway." [Laughter]

N: Because you don't agree with me!

McL: Yes! [Laughter] I still think I was nearer right on this particular matter than he was. That was 1916 after we had returned to Cambridge and I was working on my Ph.D. thesis.

During my second summer I continued to do field work for Graton's Secondary Enrichment Investigation, and spent several months with him and a couple of others on his staff studying some of the copper districts in the United States, where the ores were very different from those at Kennecott. So I really had a wonderful introduction to mining geology and field geology with him at that time.

N: You were saying that you got an interesting paper out of the Alaska experience. Did you write this up and have it published?

McL: Yes. That was one of my first papers. Alan M. Bateman was co-author. Graton and I also published some papers together--I was junior author in each case.

N: I hope to have this full list of your various papers, because I think they're of great interest.

McL: My secretary, Janet Guell, I think has a full list of them. Nothing of very much importance. [Laughter] But quite a few when you stack them all up.

N: All that you learned in Alaska and in your other copper investigations in this country, were these experiences of value to you when you were in Peru?

McL: Oh, yes. I was doing my doctor's thesis on a certain type of copper ore, the title was "The Bornite Ores of Copper," which was another copper mineral that we thought, or at least Graton thought, had rather special significance in the secondary enrichment process.

N: I take it as the ores become less rich the technology has to develop--from prospecting for them to exploiting them after they are found.

McL: Yes. It really is true that the rich ores are quite conspicuous. Copper forms malachite which is a beautiful green mineral, and azurite which is a lovely blue mineral. The outcrops of the ores are easily recognized. Anybody'd spot those wonderful ores. I won't say they've all been found, but certainly the easily found ones have been. The sources of copper today will be from the lower grade deposits, some of them of immense size, and they can be worked successfully from a commercial standpoint only by mining on a huge scale. Instead of mining a few hundred tons a day, fifty to a hundred thousand tons of ore per day or even more, have to be mined and treated. Those are the great sources of copper today.

N: Where are they?

McL: Many are in the United States. The mine at Bingham Canyon in Utah is still the greatest. It is the major operation of the Kennecott Copper Corporation, which took it over from the Utah Copper Company after it had been brought into production by Jackling. And then a mine of the same sort, another porphyry copper, is at Ely, Nevada. Mrs. Nixon grew up there, for her father was a miner. It is another of the same corporation's mines, where similar ores are mined and treated.

And there are a number of mines of the same sort in Arizona, at Ajo in the southwest near the border, Morenci near the New Mexico line and many others.

Indeed, some of the old districts that started rich in ores, evolved into these big, low-grade operations when the high grade ores were exhausted. An example is Bisbee, Arizona. And then there's another great deposit just across the Mexican line, Cananea, that the Anaconda Company developed on a big scale. Nacozari was another large operation in Sonora. It was underground and is worked out. There has been great success in finding and developing new mines in this southwest copper province and so far production has been maintained at a high level in spite of some of the ore bodies being worked out and shut down.

Of the high grade ones, Butte, Montana was the most outstanding. For many decades, high grade vein deposits were mined there. Hearst was very much involved in that district, as I think I mentioned. The Anaconda Mining Company--one of the major American mining companies--was started on these properties. In the early days, very high grade chalcocite ore--almost comparable in richness to that at Kennecott--was mined from a number of wide veins. The ores became lower in grade when the veins were followed below the zone of secondary enrichment but good ore--high grade by present standards--is still being mined from many veins to depths of over five thousand feet. More recently, however, it has been possible to mine large blocks of ground with numerous copper bearing seams and stringers, and so a huge open pit mine has been developed over some of the earlier underground mine workings.

N: It really changes the face of the earth, doesn't it?

McL: Oh, yes. Very much. Though these great pits themselves are quite scenic things--they will be sights that tourists will come to see. [Laughter] They are tremendous things, really very interesting, and I don't think they've damaged the face of the earth at all from an aesthetic standpoint. Both the Kennecott and Anaconda companies also developed huge porphyry copper mines in Chile. The Chuquicamata deposit

McL: mined by Anaconda in an immense open pit is truly one of the largest copper ore bodies in the world--if not the largest.

N: Is there copper in Africa?

McL: Yes. Important discoveries were made in what was then Northern Rhodesia in the '20's and much earlier than that in the Katanga country on the Congo side of the border. The original Katanga deposits were famous for the amazing specimens of malachite that they contained. The ore was oxidized near the surface and these conspicuous carbonates of copper were the principal copper-bearing minerals.

The Cie de Mines du Haut Katanga--a Belgian company--developed the great mines in the Katanga area. They eventually went from very rich oxidized ores like malachite and azurite into rich sulphides in depth. A copper-bearing belt runs from the Congo diagonally across the boundary line into what used to be called Northern Rhodesia; it's now Zambia. Across the line to the Southeast, for great distances, a succession of copper deposits occurs. In the '20's there were very important discoveries made along this belt. The first one was the Roan Antelope mine. A number of truly great copper mines have been developed now in that country.

There was American interest in one group, the Rhodesian Selection Trust. Another group of big mines is controlled by the great Anglo-American company. Those properties have now been taken over largely by the Blacks. As long as the whites stay to run them I suppose they'll turn out copper. I think it's probably a livable arrangement, but the natives of the country, one way or the other, are going to get a much bigger share of the profits. That happens in most foreign mining or oil ventures. The first foreigners who go in and who are the pioneers are warmly welcomed for the skills and the capital they provide as well as their willingness to take chances and develop the dormant resources of a primitive country. Then after they've spent the hundreds of millions necessary to do it, they are apt to be denounced as exploiters of the mineral wealth, and the nationals who really had nothing to do with the development of these mines--who didn't have the initiative or the ability to do it--now claim them. That's the usual pattern. I suppose we shall have to get used to it.

But along the way most of the companies that developed the mines have secured pretty good rewards, too. It is rather painful, however, to have to give up these enterprises when they are becoming highly successful. Remember that cartoon in the New Yorker of the two Arabs sitting up on the hill looking down at a refinery that's being built and one said, "Shall we go down and take it?" and the other said, "No, wait 'til they finish it!" That's the spirit of the times. [Laughter]

McL: Probably a wise policy would be never to finish it.

N: Well, as you describe it, if the developers have had their adequate returns...

McL: It's all depending on what you call adequate. They took the risk so they deserve a very high return. But I'm just a frank imperialist! [Laughter] And I think these great companies who have gone in and developed these ore deposits and the oil have done a wonderful service for which they get very little credit. They deserve much more credit and generous rewards. They've transformed absolutely poverty-stricken areas, where people were living under primitive conditions way below what we would call a subsistence standard.

Their lives were on the grim side at times, but perhaps they were not too unhappy. You can really get used to pretty extreme discomfort and monotonous existence if you haven't experienced anything else. I've lived with people like that back in the Andes and never thought of it as a depressed area. They had a rather restricted food supply and they wove their own clothes and so on. It was utter poverty by our standards, but their life had a certain dignity and I found it endurable when I lived with them at times. When these great mining operations come in, their standard of living in all material terms improved immensely. And we're blamed for exploiting them.

The tragic thing in those countries is when these same people leave their mountain villages and their remote country and go down to the big cities. There they really live in unspeakable slums. Then it does seem like harsh poverty. Yet those people living there will have a great deal more than they had when living in the mountains, but it just seems sordid and horrible, whereas back in the mountains, in their little villages, there's a certain dignity about the life. Awfully dull, perhaps, but they enjoyed building churches and having festivals and getting drunk occasionally.

But somehow it's when they come down to the margins of the cities their extreme poverty really seems so horrible. Practically all the South American cities have these slum areas around them that may be more picturesque than ours, perhaps, but they're another lower order of magnitude.

N: This is certainly apparent in Mexico.

McL: Yes, but Mexico isn't nearly as bad as Lima in Peru, or Rio, or even Bogotá. But I think one could make a good defense of what the mining industry has done to make it possible to improve the lot of these people.

N: I wanted to remember just one thing about copper, either here or later, to ask you about the variations in the price of copper.

McL: Metal prices over the years have been a bit erratic, with rather wide swings, but the general trend has been up for most of them. The price of copper has gone up, of course, but not too much out of line, with the depreciation of the paper dollar in which prices are quoted. Oh, in the Depression copper got down to some absurdly low price. In those years it was running around ten or twelve cents. I remember Graton publishing a brief at one time claiming that anticipated profits from copper mines should be estimated on the basis a price of 17 cents a pound. That was considered to be a rather bold prediction at the time. Now copper--you can look it up in the paper--it's up four times that. But so is the cost of haircuts, or the fare on the cable cars: five cents--twenty five cents. [Laughter]

N: Maybe riding the ore bucket is the only thing that hasn't gone up! Laughter]

McL: It's the purchasing power of the dollar that's going down. But that gets us into still another subject! [Laughter]

N: Yes, we must go back to the dollar later. After your Ph.D. at Harvard, did you then get into the service?

McL: Yes. After I had my Ph.D. I had a rather tentative offer from Yale for a job--it was an instructorship. I don't think it was actually formally offered, but I think I could have had it. Didn't take it, [laughter] I'm glad to say. I went out to the Magma Mine in Arizona and worked that summer on a geological job, with an old friend who later became an associate for most of my life, Guy [N.] Bjorge. That's the Magma Mine at Superior, Arizona--a great mine.

N: Was the Magma Mine a copper mine also?

McL: Yes. It was a rich copper mine. Bornite, a bronze-colored copper sulphide, was the principal mineral in the ore there, so I found it particularly interesting. The mine was then about seventeen hundred feet deep and very hot. It is now four thousand feet or more deep and much hotter. When I was there, the ventilation underground was rather primitive and the working temperature was about one hundred degrees. Now the rock temperature on the deeper levels is over 135 degrees, but made endurable by rather costly ventilation and cooling.

VII ARMY SERVICE: WORLD WAR I

N: So, up to this point you had been in copper entirely.

McL: Yes. I was at the Magma Mine just a few months in the summer before I was admitted to the Officers' Training Camp in San Francisco. But I lost so much weight there in the heat both in the hot mine and on the surface that I almost didn't get in the Officers' Training Camp until I told them what I'd been doing. They said, "If you put on ten pounds in the first three weeks, you can stay!" And I did! [Laughter] The cool fog at the Presidio probably had more to do with it than the food.

Good friends of mine, the Walter Blisses, had a lovely house on Vallejo Street near the top of the Lyon Street steps and four of us in the camp were invited to an early dinner every Thursday. Kenneth Hayes and Henry Breck--whom I had known in Berkeley, were in Mrs. Bliss's squad as she called it. Perhaps those dinners had a bit to do with my prompt increase in weight. At the end of the six weeks of training, the most popular appointment was a provisional second lieutenancy in the regular Army. So I applied and was accepted. It seemed the right thing to do at the time. We thought that it was the highest award we could get, better than getting a captaincy in the Reserves. So I became a provisional second lieutenant in the regular Army and was assigned to the 63rd Infantry. We had the privilege of wearing U.S. on our collar, not U.S.R. which we thought was a very great honor.

The highest rank I attained was First Lieutenant, in the regular Army. Probably if I'd become an officer in the Reserves I'd have been over in time for some of the fighting and been killed, as some in that training camp--many of them--were later. It happened just by luck that the regiment to which I was assigned was kept in America as a training regiment for quite a long time. I thought it was bad luck then, but I became reconciled to it. We didn't know what was going to happen. We were held at the Presidio for several months and then moved to Fort Meade between Baltimore and Washington. So I got my service stripes largely for winning the war in San Francisco and

McL: Washington. Finally I was sent abroad on a special party ahead of our division, supposed to get some special preparation for particular jobs before the Division arrived. So I had a completely inglorious war experience, but quite by chance one that let me survive. I did get overseas before it was all over but didn't see any action at all.

N: Had you taken officer's training on the campus, or was there such a thing?

McL: Yes, I was a Cadet, and I had the rank of Captain Quartermaster of the Cadet Corps, which let me act as Adjutant of the Regiment once in a while. So I think the largest number of men I've ever commanded was as Acting Adjutant of the Regiment on the campus at some of the reviews. [Laughter]

N: I see. Did your Army activities in any way reflect what you had been learning about mining and geology?

McL: No, I don't think so. They paid no attention to that. The engineers were assigned to the infantry, and the boys in the liberal arts were assigned to the engineers in those days. [Laughter] There was complete lack of utilization of specialized knowledge--in the First World War. I think we did much better in the second war and of course now things are so technical that I think there's much more attention given to utilizing special skills. But in the first war they seemed to be quite indifferent to what a man's preparation was.

N: Of course, by this time, you had had both a lot of education and a lot of experience.

McL: Yes, but I am afraid it was of a rather too specialized sort to be of much use at the front. I was put in the infantry, just straight infantry [Laughter]. I did have assignments as a battalion adjutant and a regimental intelligence officer, however, that were interesting at times.

N: I guess we haven't gotten you out of the Army yet, have we?

McL: No. In France I was at a Camp at Gondrecourt, not very far from Verdun.

N: Now, let's see--did you tell me how to spell that?

McL: No, I didn't and I'm not sure I know. [Laughter] There was a school there for field intelligence--between the lines stuff. It was probably lucky for me I didn't get there earlier. I didn't reach Gondrecourt, France, until shortly after the Armistice. I remember I got a pass without a date on it, which was awfully handy.

McL: I went off on my own for awhile. On my way to Paris, I was hiking over to a place to get a railroad train, and of course trains were very uncertain then. I met an American regiment coming back from the front, and ran right into Ralph Eaton's company--he was a Captain in the Massachusetts Regiment--and I didn't know whether he had survived or not. His regiment was coming back from the Argonne where it had been pretty badly mauled by the Germans, and there was Eaton, my roommate, coming by. So I joined them for a couple of days on the road.

N: That's incredible.

McL: And then I went back through Paris and ran into Professor Daly, who was working in the Y.M.C.A. there. And he'd been in Paris Armistice night, and thought it had been perfectly dreadful. He said he'd never been kissed so much in his life!

N: Poor thing. [Laughter]

McL: He was a very dignified old fellow [laughter]--then about thirty years younger than I am now.

So I ended up at Brest, waiting for a steamer. I remember that we were up in a horrible camp--mud was all around. Some of the old line sergeants who'd been made first lieutenants were really taking on all the officers in the camp most beautifully in poker. They knew poker, and they cleaned out my friends completely! These old professionals, you know, the old sergeants, were wonderful poker players. [Laughter] The boys--even with academic background--just couldn't meet such competition--and they had to learn in the hard way.

Fortunately, I still had my undated pass, which the military police respected, so I slipped out of the camp as soon as I could and enjoyed the comparative comfort of a hotel in Brest. It really wasn't bad, for even under war conditions the French knew how to make the best of what was available.

The high spot of my stay there was the arrival of the liner George Washington with President Wilson on board. I was part of the huge crowd that cheered him as he rode through Brest, properly lifting his formal plug hat in a dignified way. It was all very impressive--particularly the emotion of the people who regarded him as the savior of their country. I doubt if many men in history stood as high in popular esteem as Woodrow Wilson did during his first weeks or so in France. The relief from the grim horror of the war, the pride in victory and the hope of a safer world all found expression in the reception he received--even in the port of Brest.

McL: We were called in one morning--we'd been there a couple of weeks--and it was getting awfully monotonous at least at the camp--to volunteer to return as enlisted men just to relieve the effort of getting people back. Well I said, "Nonsense." Looked down my nose. "Officers travel as officers." You know, you have to treat the military that way. So about a half-dozen of us refused very arrogantly to go back steerage, and were promptly put on a first class Dutch steamer that just came through--a big Dutch neutral, the New Amsterdam--and that's where I met Sidney Howard, as I mentioned earlier. The shipload was mostly groups of officers going back, and nurses, and we had a perfectly marvelous time. [Laughter] I remember we spent New Year's night on that ship.

Most of them had been through some decidedly grim experiences. They talked about them only casually or in a light way, but the memory of the war was pervasive. The relief now that the war was ended made everyone a bit light-hearted--and especially when it all ended victoriously. It made even the wintery Atlantic seem a good place to be, where we had the luck to be on a well-stocked liner.

My patriotic friends who volunteered to take their chances and go back any way had a rather dismal experience for they spent another month at Brest and went back practically in the steerage. Of course, it might have been rather good for me, but I didn't mind missing it for I believe in enjoying life as much as you can! [Laughter]

N: You certainly picked up the way to do it.

McL: I got to New York with ten cents in my pocket which I used to ride the subway up to a friend's apartment--the Clarks' apartment at 470 Park Avenue--and was immediately put up. Their son--a fellow lieutenant--was coming back as an enlisted man--in the steerage--and he hadn't arrived yet! [Laughter]

He's written quite a bit. He's described a lot of those experiences. That's Edward Clark, Jr. He lives in San Francisco now. I'm afraid I'm getting awfully long-winded!

N: No, not a bit! It's curious how you see and know and experience things that nobody else has done, really.

McL: It's funny how things come back that I hadn't thought of at all. Probably if there had been a reason to think we were actually delaying the departure of any men who had really had a rough time, we might have been more complaisant. But, I didn't see any of them around Brest just then, so my conscience doesn't bother me.

N: Let's see, you got back to New York with ten cents in your pocket.

McL: Yes. And then I found that my regiment, which was the 63rd Infantry, had been stationed in New York on military police duty. It was a Regular Army regiment, and really quite a bunch of very tough guys--a lot of lumber jacks. I had been over on advance duty, but the regiment didn't get over at all. I was assigned back to active service with the regiment, and couldn't get out for several months. A couple of times a week I would be Officer of the Guard, or Officer of the Day, from Columbus Circle to the Grand Central Station.

N: What did you have to do?

McL: I was in charge of the Military Police in that area. Many of the boys coming back from overseas were out for a wild time in New York, and it was very entertaining! [Laughter]

They were inclined to say some tough things about these Regular Army soldiers who hadn't been overseas--which led to some rough sessions now and then. I don't know why that regiment didn't get overseas, but it didn't.

N: Was it difficult to leave a Regular Army assignment?

McL: I think the idea was that they didn't know what might happen in this country and they wanted a few, very tough, old units at home. So it was rather typical to put a regiment like that as Military Police.

I don't know what was the basis for that decision, but there they were.

VIII CERRO DE PASCO: COPPER MINING IN PERU

N: I was thinking, too, of when you were ready to leave the Army. Was it harder for you to get out?

McL: Oh no. Then they were beginning to disband the Army very quickly, so I got out and came home to California. About that time--or rather about a year earlier--a program of geological work had been started in Peru for the Cerro de Pasco Copper Corporation. A well-known geologist who had been on the U.S. Geological Survey, John M. Boutwell, had been engaged as the consulting geologist for the Cerro de Pasco Company, to assemble a staff and to organize a geological study of the districts in Peru where the company operated. He got the job after he had met Edward Clark, the President of the company, in my room at Harvard. Edward Clark was the manager of the Hearst estate which at that time still had a substantial interest in the Cerro de Pasco Company. So it's funny how these things tie together.

He offered me a job at the beginning of the war to go to Peru with him, but I couldn't. I turned it down and went into the Army. When I came out of the Army, however, I accepted the job in Peru. But I came home for a few months before that, and--oh, there were other jobs I was considering too. But the Peruvian job was very alluring.

That was the spring that Mrs. Hearst was so ill and died. I remember the last time I saw her, she said, "I knew all the time that you would decide to go to Peru." And so I said good-by to her; that was the last time I saw her, for she died a few days later.

N: Was this in Pleasanton?

McL: That was in Pleasanton, yes. Her funeral was in the basement of what's now Grace Cathedral--it hadn't been completed. I remember that I was a pall bearer and that Morse Stephens died on the cable car on his way home from Mrs. Hearst's funeral. His funeral was the same week in the Faculty Glade. It was a sad week.

McL: So then I went off down to Peru, I think that was in May in 1919.

N: And how was your Spanish at this point?

McL: My Spanish was zero. I'd had French and German in college--that's what you had to have for your Ph.D. I can't say I ever mastered those languages, though I could read them enough to get my Ph.D. [laughter] and meet the language requirements. I went to Peru with practically no Spanish; I think by the time I left Peru I was fairly fluent in Spanish, at least in the Sierra, but never elegant enough to be comfortable in Lima society.

N: Were the people who worked the mine Indians mostly?

McL: Yes. The technical staff in those days was largely American and English, and the miners were mostly the Peruvian Indians, cholos they called them, in the high country. The mines were all at very high altitudes in the Andes. Cerro do Pasco itself is at 14,200 feet.

N: Is there an oxygen problem at that height?

McL: Oh yes. Nearly everyone going up is decidedly uncomfortable. They range from just being uncomfortable to being very, very ill with "soroche," the mountain sickness. It has been established now that after you've been up in the high altitude for awhile you build up a much higher blood count of the red corpuscles, and then you feel fairly normal. In fact the initial work that revealed this change was done by a distinguished group of American and English medical scientists who came to Peru while I was still at Cerro de Pasco as a geologist. Barcroft--I think he was knighted for his work--was in charge of the group. They had three baggage cars on the railroad fitted up as laboratories, and made tests of the Indians and also tested the Americans who were living up there. So I was one of "Barcroft's guinea pigs."

The mountain and the University's high altitude station in the White Mountains on the east side of the Sierra Nevada and the Owens Valley is Mt. Barcroft, named after this scientist. When they were reaching the end of their work at Cerro de Pasco, we set up a controlled experiment for them to study the effects of alcohol and dancing at 14,000 feet! [Laughter] And we had a whale of a party which the doctors all attended. [Laughter] They actually did make tests the next morning, but didn't tell us what they found. That was probably around '20 or '21.

N: Fine. Now, were you dealing at all with the national government in Peru?

McL: I wasn't personally, though I knew a number of engineers and geologists

McL: who had positions in government agencies. I was much too far down the ranks ever to have any particular dealings with the government officials.

N: Were the geological problems similar to those in Alaska?

McL: Yes, there is a certain similarity all through the field of metalliferous deposits, but in Peru they were quite unique deposits in many ways. It was a great area in which very, very little geological work had been done, so it was a beautiful opportunity to wade into a new field. Something like the old geologists who came out here in the West in the early days.

Some History and Geology of The Cerro de Pasco District

N: Shall we talk a bit more about the character of the Peruvian copper mines?

McL: Yes, there was the old district of Cerro de Pasco. I don't think there is any record that the Incas worked it, but the Spaniards, way back in the early 17th Century did mine silver there. It's a multi-metal district. It started with very rich silver ores in the superficial weathered part of the deposit--a rusty layer two or three-hundred feet deep--called the pacos. The metallic sulphides, such as enargite, pyrite, galena and sphalerite that were abundant in the original ore, were converted into oxides, carbonates and sulphates by weathering. The copper was leached out of it, gradually washed out of it. Lead was converted into an insoluble sulphate and remained in the pacos, but zinc was washed out. Silver was retained and enriched. In a sense, it is a superficial scab, you might say, of material enriched in silver and lead and impoverished in copper and zinc over the original sulphide deposits.

N: What does "enriched" mean in this usage?

McL: The increase in metal content of the ore in the course of the weathering. That is, a sulphide ore of silver that might have had only about ten ounces of silver to the ton was enriched in spots to ore that might run a couple of hundred ounces of silver to the ton. And those were the rich ores--the bonanza ores--the Spaniards went after. Their old underground workings in the relatively dry rusty ore called pacos were excavated in a most irregular way in their search for these places. Their digging resulted in a honeycomb of antlike openings all through this zone. They mined out the rich ore and treated it for silver by what is called the "patio process."

McL: The canyons north of Cerro where there was water have numerous tank-like receptacles built out of cut stone twenty to thirty feet across. The ore was dumped in these patios and crushed by rolling big heavy stone wheels around on it. Then it was stirred up by horses that were turned in to mess up the mud. Common salt was put in and probably a little copper sulfate and then a little mercury to catch the silver. It was a long, crude, painful process--painful that is for the horses--but they did it fairly cheaply, and they undoubtedly recovered a lot of silver.

The district was probably worked by the Spaniards for more than a century from about 1636 to 1800, almost exclusively for silver, going after the rich spots. The ore was dug out from underground excavations called "bovedones" and carried in leather sacks up steep steps in gopher-like holes called "media barretas." When the excavations became too large, they simply caved in leaving a depression called a "tajo" at the surface. Young boys were used to pack the ore to the surface for they could get through the small holes more easily. These were the good old days before the Americans came.

And then it was realized there was copper ore in depth--very rich copper ore with silver sulphides also--underneath this zone of rusty, oxidized material. And copper and some silver that had been leached from the superficial ground was redeposited as sulfides in another very rich layer of ore. Some English companies in the twenties came in to work the rich material, but were handicapped by the water that was encountered under the pacos cover and by the lack of fuel for smelting.

N: This was in the 18th Century?

McL: This was in the early 19th--1820's--around in there and later. And the Cornish engineer Trevethick installed one of his famous pumps in Cerro de Pasco. A huge Cornish pump was carried up from the coast across the high western ridge of the Andes. How they did it, I don't know--on men's shoulders, probably! They had a Cornish pump in there to try to lower the water level and mine the rich copper-silver sulphide ores below the layer of silver bearing pacos. There was a great deal of water after you got below the oxidized ore--the layer known as pacos. The rich sulphide ores were down there under the water. I don't think they ever made any real money out of it, but the ore was very rich, both in copper and silver.

Sporadic efforts of that sort went on for years and years, and finally an American syndicate that grew into the Cerro de Pasco Copper Corporation was organized in the early part of this century to acquire a large block of claims and to undertake the mining and smelting of the ores on a large scale. I don't remember the dates--

McL: Nineteen hundred six or 1907 or 1908. And the Hearsts participated in it--or rather the Phoebe Hearst estate did--under the management of Edward Clark--simply as one of the syndicate.

N: Was it mostly an American syndicate?

McL: Yes. And Haggin--

N: Haggin was in it, too?

McL: The old Haggin of Homestake, or his son, Louis Haggin. The Haggins were the dominant members of the syndicate. A railroad was built from Oroya, a point on the famous Meiggs Railroad across the Andes; for some eighty-three miles to the north, shafts were sunk and important new bodies of copper and silver primary ores were found in depth on veins. Some important bodies of lead-zinc-silver ores were also encountered. A large coal deposit was found thirty miles or so to the northwest which provided fuel for the railroad and coke for the furnaces at a new smelter at a nearby site called La Fundicion.

N: Were these Peruvian interests?

McL: No, there were no Peruvians in it at all, as far as I know. The titles to the deposits were acquired by purchase from the owners of the mining rights that were vested in hundreds of small blocks called "pertenencias"--somewhat similar to mining claims in our west. A man named McCune promoted the venture. He obtained options on the mining "claims" and assembled a large block of them in a unit large enough to warrant the costly exploration and development--including the railroad, smelter, etc. that the syndicate undertook.

N: Was he doing, in a sense, what George Hearst did in lead--bringing together holdings?

McL: In some ways, yes, though he wasn't as successful or probably as brilliant a man as George Hearst. But he brought this property to the group in New York, and they formed a syndicate to go down and investigate, and develop the mines, and build a smelter, build a railroad, which they did. I don't think the returns were too good, however, until the first World War when the demand for copper and the higher prices made it a very profitable operation.

N: Then the demand for copper increased? Is that part of it?

McL: Yes. A long time before the syndicate became interested--this is back in the 19th Century--a long tunnel had been driven from a canyon to the north of the district, but it drained the mines only

McL: to a depth of a little more than two hundred feet, not quite far enough.*

N: Oh, I see. And the tunnel got rid of the water.

McL: Yes. Well, it lowered the water, and made it possible to work some of the shallower rich copper ores. But to go deeper required pumping and pumping required power. There was a variety of small companies trying to mine the richer copper ores near the surface, but they operated only on a small scale without much success. The Cerro de Pasco Company was the first organization that had the means to install the plant, provide the power and transportation that made it possible to operate on the scale necessary for success.

N: Now, the presence of this large quantity of water--is this characteristic of copper mines?

McL: Generally when you go down into the earth, even in arid regions, you are likely to encounter very heavy flows of water unless the rock is very firm and tight. Rock that is permeable may have a great deal of water in it. And, of course, it has always been a great handicap for the primitive miners--before the age of power it was almost prohibitive--they just couldn't get down below the water.

If you look at some of the old books like the De Re Metallica which was published in the 16th Century, you can see drawings of many ingenious devices for getting the water out of mines, but they just didn't have enough power--just men, horses or rather primitive water wheels. The steam engine hadn't been invented. When it was, its first application was for pumping water from the tin mines in Cornwall. As I mentioned, a Cornish pump was installed in Cerro de Pasco early in the nineteenth century--and there were a number of them in the gold mines in California a century ago.

N: So, I'm assuming then that the people who actually worked the mines were the Indians who lived there? Or did they bring in people?

McL: The laborers were the local Peruvian natives--the cholos, as they

---

*Cerro de Pasco is nearly on the divide between two major tributaries of the Amazon. The surface waters flow to the south into Lake Junin and the Mantaro River whereas the mine waters drain through the tunnel (called the Rumiallana Socavon) to the north and flow into the Huallaya River and the Marañon. They eventually unite at Iquitos. So Cerro might properly claim to be at the very source of the Amazon--though, of course, no great river has a single source.

McL: were rather disrespectfully called by the Spanish who found the silver deposits. The Indians supplied the labor, and in the early colonial times it probably was pretty close to being slave labor; and they were the first exploiters of the mineral districts. The first mining was by the Spaniards for silver and then the English came in after copper in addition to silver. And now the large Cerro de Pasco enterprise recovers not only copper and silver, but also lead, zinc, bismuth, gold and other metals from the ores of the district--and from a number of other deposits in this part of the Andes as well.

N: When your syndicate, then, went in--were there people there who knew how to do mine work, or was there training?

McL: There were people--Spanish Peruvians and Indians--who had a tradition for mining, but little or no skill in modern methods. That was when new mining practices and modern machinery were introduced. The engineers and managers were mostly Americans or Canadians. The Peruvian Indians supplied the labor and were trained to handle machinery far more complicated than they had ever worked with before. The Indians were miners, yes, in their primitive ways, but they had to be shown lots of things.

In those old workings in the 18th and early 19th Centuries, the silver ore was carried out of the mines on the backs of little boys or men. That is, they generally didn't even have hoists, you see. Or if they had a hoist, it was just a windlass with a horse walking around to pull a bucket out, but in most of these old Spanish mines, they didn't have vertical shafts. They were really like ant hills. You'd go down through narrow inclined holes you could just barely get through. They'd have stone steps going down where it was steep. Some of these inclined passage ways went down two or three hundred feet that way. When rich ore was encountered, they mined it out leaving large open chambers called bovedones. When they became so large that they collapsed, the miners simply started another one.

There was one hole of this sort at Cerro called the Tajo Mata Gente--the killer of people--and I imagine some of their bones may still be there if they haven't gone through the mills and furnaces when the whole mass of ground was mined much later.

N: How did they obtain light in those very early times? Torches?

McL: They'd have just a little oil lamp of some sort.

N: Does it get hot?

McL: No. Oh, there's bad ventilation, yes, but they're not deep enough to

McL: get hot.

N: At what level does heat become a problem?

McL: Oh, it's not really a problem till you--well, this is hard to answer, too, because it varies so much in different places, but in most of the mines you don't have a serious heat problem until you're down over a thousand feet.

I was thinking of one mine in Arizona. Even at seventeen hundred feet the Magma mine was terribly hot before they had proper ventilation.

Now they've gone very, very much deeper, but with ventilation to control the heat. At Homestake we're down sixty-eight hundred feet, and the rock temperature is about one hundred twenty degrees, which means you have to circulate a lot of air through the mine to make it tolerable.

On the other hand, in South Africa, the mines are down to twelve thousand feet and the rock temperature isn't as bad as what we have at Homestake. The flow of heat from the interior of the earth is very different in different places. Well, up at the geysers up here in California you have superheated steam within a few hundred feet of the surface. You couldn't possibly put a mine down against that--unles there happened to be fabulously rich ore there, which there isn't, at least as far as we know, although there are some rather small deposits of quicksilver not far away.

N: And I suppose there is not yet a way of making use of this heat.

McL: Pacific Gas & Electric has a plant up there at the geysers now. And I don't think that this planet's ever going to run out of energy because we're just on a thin crust over a very hot body. So if we had to, I'm sure the heat of the earth could be tapped at places that would provide a lot of energy.

The Syndicate and the Railroad

N: Yes, I see. Can we go back a moment to Cerro de Pasco and its development by the syndicate?

McL: As I said, it was really started by an energetic promoter named McCune who was impressed by the potential wealth there and who put together a large block of claims that included the most promising ground in

McL: the old district. He got control of them and then offered them to an American syndicate. That syndicate included J. B. Haggin, you see, George Hearst's associate. Hearst was dead then, but the Hearst estate participated in this enterprise under the direction of Edward H. Clark, who was managing Phoebe Hearst's fortune. It was a fairly large syndicate that put up the money.

Prior to that time, a railroad had been completed from Lima over the rest of the Andes to a town called La Oroya. It was started in the seventies by Henry Meiggs, but did not reach Oroya until 1893. Meiggs had been City Treasurer of San Francisco in 1855. The story is that he left here rather suddenly under questionable circumstances. He was, I think, going to be indicted for alleged embezzlement of public funds. He went to Chile where he achieved his first great success as a railroad builder by completing the Valparaiso-Santiago line. He then went to Peru where his outstanding work was the Central Railroad. He is a historical figure here in San Francisco. You may have heard of Meiggs Wharf? That's the Meiggs. He was both a promoter and a builder on a grand scale--really unmatched in the railroads he laid out and built through mountainous country. Our Sierra Nevada line by comparison is rather tame.

N: And the line in Peru was called the Lima Railroad?

McL: Officially it is the "Ferrocarril Central del Peru" - the Central Railroad of Peru. It was also referred to as the Oroya railroad. In 1878 it had reached a little canyon town called Chicla at an elevation of about twelve thousand feet where it was stalled for a long time largely on account of financial troubles arising from the war between Peru and Chile. In 1893 it was finally built through the top of the range at Ticlio (15,160 feet) and down the Yauli Valley to where it joins the Mantaro River at the little town of La Oroya, only seventy-nine miles from Lima, but on the Atlantic side of the Andes.

Fifteen years later the line was completed for another seventy-eight miles down the river to Huancayo, a large market town in a broad high valley in the plateau country. The Cerro de Pasco Company then built a railroad from La Oroya on the Central Railroad up to the District of Cerro de Pasco some eighty-three miles to the north. Oroya is at 12,250 feet, but at Cerro de Pasco the railroad reaches an elevation of 14,200 feet.

N: It must have been of enormous difficulty.

McL: Building the railroad was relatively easy. The line went up a gentle grade along a stream and across a pass to the broad Pampa de Junin which it followed to the cluster of hills at the north where the ore

Donald H. McLaughlin
Peru - 1924

On puna above La Oroya

McL: deposits outcropped close to the divide between the Mantaro and Huallaya Rivers, two of the largest tributaries of the Amazon. The enterprise as a whole, of course, was extremely complicated for new shafts had to be sunk, power provided, coal mines opened up and a smelter built. The mining started on high grade sulphide ores of copper and silver that the Spaniards hadn't been able to reach on account of water. Then the war came and copper prices took a big jump and Cerro became a very profitable company indeed. It's grown and grown since then until it's one of the great companies of Peru.

Not only did the syndicate buy a large part of the Cerro de Pasco district but a little later they got some very good copper-silver mines in a district called Morococha almost on the very crest of the Andes. Considerably later, about 1920-21, a new smelter was built at Oroya, which is still going. In the course of the following years the Cerro company acquired a great many other properties too that are tributary to the smelter at Oroya.

A company called the Cia Minera de Buckus and Johnson, started with some English capital by two Americans in Lima, was successful in operating some mines at Morococha and Casapalca, two districts lose to the Andean railway (the Ferrocarril Central del Peru) practically at the crest of the western range. The company operated a smelter at Casapalca. The American syndicate also acquired properties and started mining in Morococha under the name of the Morococha Mining Company, which was at an early date consolidated with the Cerro de Pasco operations to form the Cerro de Pasco Copper Corporation, which eventually acquired the Backus and Johnson properties.

An independent company owned by E. E. Fernandini of Lima also had a substantial mining operation in Cerro de Pasco itself, as well as a very rich silver deposit called Colquijirca not far from the smelter at La Fundicion. The Fernandini company for some years operated its own smelter, but eventually its ores were treated in the large plant at La Oroya, built by the Cerro de Pasco Copper Corporation in the early twenties.

A third independent operation in the vicinity was a French company Cie des Mines de Huaron, which had a good mine in the high country, west of the Pampa de Junin. The famous vanadium mine at Minas Ragra, at an elevation of over fifteen hundred feet in spectacular country close to the crest of the range west of a lake in a glacial valley called Punrun, completes the list of other mines that were then operating. None was as large as the Cerro de Pasco enterprise and all of them in the end contributed either through acquisition or sale of their products to this big operation.

In those years--I was down there six years--I started as a

McL: geologist at Cerro de Pasco itself, and then became chief geologist for the whole corporation--all their operations in Peru. I organized their exploration work, and the geological mapping to direct the development work in the mines, and so on. Great fun!

N: Weren't you a very young man to have such extensive responsibility?

McL: I had been in the army, you see, then, so I was, let's see, how old was I?

N: Under thirty still?

McL: Oh yes. I went down there when I was about twenty-seven. I was down there six years. I might have been there the rest of my life, but a professorship of mining engnneering at Harvard became open--a well known professor, Henry L. Smythe, had retired--and I think largely due to the influence of Graton that full professorship was offered to me! I was about thirty-three then. I couldn't resist a full professorship at Harvard, so I went back. I think I was the youngest full professor at Harvard at that time.

N: Imagine. Of course then you hadn't had to go up the ladder.

McL: No. So I hopped! [Laughter] All the ranks. Which is a wonderful way -- that's why I never had any worries about academic succession. I think they took an awful chance, but they did, which was a very fortunate thing for me. They shouldn't do those things.

N: Before we leave Cerro de Pasco I would love to hear a little bit more about the life there, and what a geologist does for a mining concern.

McL: In the early days that I was at Cerro de Pasco, in the early 1920's it was a very remote place. It took two weeks to get down by steamer and it was a hard, very hard, day or two days up the railroad to Cerro de Pasco. You were in quite an isolated community up there and living at a very high altitude. There were some rather nice little cottages for the American employees. Most of the Peruvian employees lived in the town of Cerro de Pasco, which was somewhat picturesque--but really a pretty horrible little town up at that high altitude. The area is like some of the bare uplands in Wyoming, with high broad open grassy plains flanked by smooth hills--very high of course--but not very impressive in relation to the plateau. Really not much rougher than the Berkeley hills, except that off in the distance you could see the western wall of the Andes, where some of the peaks go up to twenty thousand feet, a great series of snow-covered peaks. To the east too, there were several isolated high mountains. One high glacier-clad peak off to the east, called Huagaruncha, was particularly conspicuous; a magnificent sight, really, over this rolling, high

McL: plateau.

The Morococha district, however, was close to the crest of the western range, right in a cluster of sharp peaks, lakes and glaciers. For anybody who liked high country and mountains it was really a very thrilling place.

The highest peak visible from the Cerro region is Yerupaja, one of a cluster of sharp ice-clad mountains some thirty miles to the northwest. The altitude of Yerupaja is around twenty-one thousand feet, which almost matches that of Huascaran in the Cordillera Blanca. When I was in Peru, Yerupaja (sometimes called El Carnicero, the Butcher) had never been climbed but it has been scaled since then. It looked unclimbable to me and some of the stories about the ascents are hair raising. To the north of it is a pinnacle that resembles the Matterhorn, though it is considerably higher. The best view of the western range is from the coal mining town of Goyllarisquisga, on the eastern rim of a tremendous canyon that drains into the Huallaga River.

The Yerupaja group, only thirty miles or so away, dominates the western skyline above the pampas across the canyon, and the long wall that defines the continental divide to the south is ornamented with dozens of lesser peaks--some over nineteen thousand feet--and all of them with fine glaciers on their flanks. Among them, Raura, where we developed a mine some years later, is the most conspicuous.

The western range was mostly carved from well bedded, intricate folded sediments--light colored limestones and grayish quartzite exposed in terrific cliffs and jagged spires with here and there a more rounded mountain worn from a porphyry stock. It was truly a paradise for a geologist--even more exciting for him than for an alpinist. I didn't attempt any very difficult climbs but I did get to the top of Yanasenga (Black Nose in Quechua), the highest peak near Morococha--to get a comprehensive view of the geology and physiography, of course. And I also climbed another peak nearby called Puy Puy--both are over seventeen thousand feet. Puy Puy was then a completely ice-clad cone--an eroded intrusive rock, not a volcano. Most of the ice at least on the east side has since disappeared.

My companion, George Dillingham, and I thought we should leave some record of our climb so we took advantage of our lofty situation by writing a note to God, expressing our pleasure in being so close to Him, at least in altitude, and closing with best wishes to Jesus and the Virgin Mary. It must have made an impression for on the way down several photographs show a distinct shaft of light over our heads. I must provide The Bancroft with the evidence.

The Use of Geology in the Mines

McL: In those days geology was rather finding itself as a tool to use in mining operations, but as we worked it out, and I built up a staff down there for that work, the geologists would not only map the surface and the distribution of the rocks and formations, but also map the geology exposed in the mine workings so that you could make projections and indicate where the ore bodies should be. It was expected that with the geologic features accurately plotted, the mines could be most economically developed without missing anything of importance and the ore could be mined much more completely without diluting it by mining waste. You could also make your plans for deeper levels more wisely, and in relation to the best projections or guesses about what was going to be encountered when you went down, say, another couple of hundred feet.

The mines at Cerro de Pasco itself have not turned out to be very deep as great mines go. Perhaps I should say not yet, but the decline in size and grade of the ore bodies on the twenty-three hundred foot level apparently has discouraged deep exploration. The ores become rather disappointing at that depth. There were very rich secondary copper ores in the first four hundred feet, and then a number of very fine veins of copper-silver ores with enargite and tetrahedrite not unlike Butte ores were followed down considerably farther. The district also contains huge bodies of lead, zinc and silver ore that weren't exploited until the twenties when the plants to handle them were installed.

Problems of Metallurgy

McL: And now, a large open pit mine has been developed over part of the old district. Ground that had been originally honey-combed with old Spanish workings for silver was stripped in a pit, and the superficial layer of oxidized ore was treated for the low-grade silver in it. Then beneath that sort of ore, locally called pacos, a great mass of sulphides was exposed which has been the principal ore mined in the open pit. The ore is a complicated mixture of sulphides and it took a long time to work out the proper metallurgy for its concentration and the separation of the metals. It's very, very different from the copper mines called the porphyry coppers. The principal deposits at Cerro were great bodies of sulphides, with immense tonnages of pyrite, containing local masses with abundant copper minerals and also portions with high content of lead and zinc sulphides. From a metallurgical standpoint, it was very difficult to concentrate and separate

McL: these metals from such a mixture of minerals--particularly in ground that contained many soluble sulphate minerals. It was a tough metallurgical problem, but it has been pretty well solved.

So the ore reserves of the mine are still large though it is not one of the deep mines of the Andes.

N: I didn't realize that a mine goes through certain phases.

McL: It really does. At any one time you wonder how long the mine's going to live. You've got ore blocked-out, as we say, that you've found, you've measured, and you know what it is. Usually it might be enough for five or six years production. As that supply of ore is being mined out, new ore is generally found, so that mine keeps on operating. And there are others. The other big mines they've developed--Morococha, Casapalca, Yauricocha--are still going on. I don't know what the ore reserves are today, but they're probably very much larger than they were when I was down there as a young fellow in spite of all that has been mined. We couldn't have predicted with certainly at that time that there was enough ore to keep the mines alive for more than a half-dozen or a dozen years though the geologists were pretty sure much more would be found. That's fifty years ago, and the mines are still going!

Rich Ores and Concentrates

N: Remarkable. I take it the metal, or the refined ore, was shipped?

McL: Yes, most of the ore in the early days was so rich that it was shipped without concentration directly to the smelter. First to the old smelter which was fifteen or twenty miles away--oh, I guess less than that--about ten miles, where it was smelted, that is, melted up. The sulphur was driven off as the gas sulphur dioxide and the rocky constituents removed as a silicate slag. The copper, silver and gold accumulated in an impure copper residue called blister copper. It's a very valuable product. Then the blister copper was shipped in great slabs up to the United States for refining.

N: Where would it come, then?

McL: That went up to an electrolytic refinery of the American Metal Company, at Perth Amboy, New Jersey, opposite New York. Now there are electrolyic refineries at Oroya and copper, lead and zinc of great purity are turned out as well as silver and some gold.

McL: About 1920 the original smelter was scrapped while I was down there and a new smelter was built at Oroya.

N: All of this handling and shipping must be very costly.

McL: Yes, it's surprising copper can be made and sold as cheaply as it is.

Now there are big concentrating plants at Cerro de Pasco and at the other mines that take the lower grade ore and make a high grade sulphide concentrate, which is then shipped to the smelter and fed to the furnaces. Smelting is a very expensive process, and you can't use a smelter directly to treat low-grade ores. You have to concentrate such ores first. The concentrates are then shipped to the smelter at Oroya, and treated in a very, very elaborate plant, which turns out not only copper, but lead, zinc, bismuth, gold and silver.

The ores are complex and are valuable for a great many different metals. As I mentioned earlier, the old Cerro de Pasco district really started as a silver district by the Spaniards. In all the canyons down stream from Cerro, there are numerous circular, tank-like structures made of cut stone called patios for silver production. The silver was, probably for a couple of hundred years, the chief product of Cerro de Pasco. Then some attempt was made to work the high-grade copper-silver ores early in the 18th century but without much success. The modern operation started on such ores but gradually changed to lower and lower grade material. Now it's the lower-grade pyrite copper ores and huge bodies of lead, zinc and silver ore--all of which have to be concentrated--that are mined. It's quite a transition. The grade of the ore treated is much lower, but high profits are won through operating on a much larger scale with elaborate and efficient machinery and adequate power.

N: As you describe your work as a geologist, I take it that the metallurgy was handled by other specialists.

McL: Oh, yes. There is a large metallurgical department. The actual operation of the mines is of course under the mining engineers who were involved in the design of the plant and mining methods. They are primarily responsible for the production of ore needed to keep the mills and smelter supplied with the particular feed that is wanted.

The geologists were concerned largely with the finding and development of new ore, and the measurement and appraisal of the ore that had been found. And then part of their job was outside exploration, too--the search for other districts, up and down the Andes--to acquire additional mines to contribute ore to the big smelter. In some ways the exploration work of that sort was the most interesting because it involved trips into remote places. In those days travel was by

McL: horseback. When you left the railroad there were practically no other means of transportation. No motor roads then.

N: Would you have a train of horses? A party?

McL: Oh, yes. You'd go out with a field party. Usually you could live on the country; you could live in the mountain villages. The people of the Sierra were hospitable and friendly--they didn't have much but they were ready to share it. They'd have a little mutton, eggs, and chicken, and some pretty heavy wheat bread--you didn't have to take very much along. It was a primitive life, but it wasn't too bad.

N: That didn't seem to bother you.

McL: No, I survived pretty well.

N: And so you did some of this exploring, I take it.

McL: Yes, I liked that part of it myself and I was out on many trips, saw some districts that will become great mines, too. Still to be developed.

N: Oh, I see. So you would just keep records of what you saw?

McL: Oh, yes, that's all in the Cerro records. Those were initial studies made of some of the properties they've subsequently acquired, and of course there were a lot of them we looked at that didn't amount to anything, too.

N: When you are looking at, say, unbroken ground, are there certain indications that would suggest to you that this is a likely spot?

McL: Oh, yes. Ore deposits are very unusual things, and there generally are signs at the surface. Of course the conspicuous ones, where you get bright green and blue stains of copper minerals are easily recognized. Many of these deposits will have a lot of iron in them, so you get a rather conspicuous iron-staining colors around on the surface. Practically none of these sulphide deposits are of any value unless there's copper or lead or zinc or silver associated with them. Our techniques fifty years ago might seem a bit primitive compared with what is done now in studying the trace minerals and observing geophysical anomalies. A lot of new devices are now used, but by and large, our old procedures were fairly effective, too--mapping of rocks and structures, determination of minerals and sampling and assaying.

N: Were you helped much by water movement, stream beds, and this sort of thing, or is that not important in copper?

McL: That's not as important in copper as it is in gold, because gold is

McL: horseback. When you left the railroad there were practically no other means of transportation. No motor roads then.

N: Would you have a train of horses? A party?

McL: Oh, yes. You'd go out with a field party. Usually you could live on the country; you could live in the mountain villages. The people of the Sierra were hospitable and friendly--they didn't have much but they were ready to share it. They'd have a little mutton, eggs, and chicken, and some pretty heavy wheat bread--you didn't have to take very much along. It was a primitive life, but it wasn't too bad.

N: That didn't seem to bother you.

McL: No, I survived pretty well.

N: And so you did some of this exploring, I take it.

McL: Yes, I liked that part of it myself and I was out on many trips, saw some districts that will become great mines, too. Still to be developed.

N: Oh, I see. So you would just keep records of what you saw?

McL: Oh, yes, that's all in the Cerro records. Those were initial studies made of some of the properties they've subsequently acquired, and of course there were a lot of them we looked at that didn't amount to anything, too.

N: When you are looking at, say, unbroken ground, are there certain indications that would suggest to you that this is a likely spot?

McL: Oh, yes. Ore deposits are very unusual things, and there generally are signs at the surface. Of course the conspicuous ones, where you get bright green and blue stains of copper minerals are easily recognized. Many of these deposits will have a lot of iron in them, so you get a rather conspicuous iron-staining colors around on the surface. Practically none of these sulphide deposits are of any value unless there's copper or lead or zinc or silver associated with them. Our techniques fifty years ago might seem a bit primitive compared with what is done now in studying the trace minerals and observing geophysical anomalies. A lot of new devices are now used, but by and large, our old procedures were fairly effective, too--mapping of rocks and structures, determination of minerals and sampling and assaying.

N: Were you helped much by water movement, stream beds, and this sort of thing, or is that not important in copper?

McL: That's not as important in copper as it is in gold, because gold is

McL: so indestructible. It tends to accumulate in streams the way it did in California, so that you get a poor man's gold deposit from which gold can be easily washed out of the gravels and sands using a pan. Then alluvial gold of this sort can be traced back to its source in deposits like the California quartz veins of Grass Valley and the Mother Lode. Probably the gold of the Incas came from gravels. No great gold mines, really first-rate gold mines, have been developed in Peru, strangely enough. Perhaps they are still to be found. Cerro de Pasco probably has produced more gold than any other district in Peru. However, it is hardly more than a by-product, but a valuable one.

N: As a geologist did you feel that you should understand all of the operations at the mine, or wasn't that essential to you?

McL: Well, when you're living in the community like that you get familiar with what's going on, though you may not be an expert in those other fields. The geological road is a very good one to follow toward higher administrative posts in mining. Of course if a man wants to be primarily a geologist and says, "I'm just not interested in anything except geology," he'll stay in geology. He'll get a living out of it, but it isn't going to be a very rewarding life in terms of money, though it may be in other ways. Of course, now and then a geologist with an independent disposition may find a mine for himself and make a fortune, which may or may not ruin him as a geologist. I didn't, but later I ended up, you see, going back to Peru from Berkeley in the forties as manager of the whole show.

N: That's quite a pattern.

McL: So it was rather an interesting transition.

N: What did you do for reading material up at the mine?

McL: They had a little library up there in Cerro de Pasco. In those days most of the technical people would bring some of their own books down. But it's very different from academic work. One has rather limited library facilities at best. But a really big enterprise gradually builds up a good technical library. You really are out doing things on your own; instead of speculating and writing papers about something, you put down drill holes or shafts and tunnels and find out what there is. [Laughter] In other words, your recommendations are generally quickly tested--and if they are wild it is found out pretty promptly, and you may be looking for a new job--perhaps on a college faculty.

N: I see. Were there families--American and English families living there?

NcL: I should say about three-quarters of the people were married down there.

McL: In the early days, before we had many amenities, it seemed to me a grim place to start a family life. The altitude, I think, bothered the women more than the men, and it wasn't too good for young children. In fact when a baby was expected in the family, the doctors usually insisted that the wife go down to Lima and have the baby down at sea level; but they came back again with their youngsters. The high altitude isn't an easy environment to live in. It's a strain on everybody. But I must say I got accustomed to it and found the climate really exhilarating.

A View of Lima

N: Did you get into Lima very often?

McL: Everybody was supposed to take a vacation every six months for two weeks, to go down to the low country. I remember on my first vacation I rode horseback down to the coast over the mountains across a pass to the west of Cerro because I just wanted to see the geology. Sort of a postman's holiday! [Laughter]

N: That sounds very strenuous.

McL: Yes. Later, when I was down there as manager I lived part of the time in Lima, where the headquarters office was situated. At that time--in the early forties--there was a motor road up to Oroya, and I could leave the office in Lima at three in the afternoon and cross a pass almost at sixteen thousand feet and be at my house in Oroya for dinner, at, say, eight o'clock that night. But going back and forth was pretty strenuous too. I got used to the altitude; it didn't bother me much. But some of my guests suffered.

N: What sort of a city was Lima at that time?

McL: Lima in the twenties was then much more of a colonial city in appearance that it is now--much smaller--much more colorful and really charming--though probably less sanitary. It's way over two million people now, much larger than San Francisco.

The old core of Lima, which was still the center of Lima, with its rather decrepit hotels and Baroque churches and palaces, was charming--still an old colonial city. Now it's become, of course, a great metropolis, and it's surrounded by suburbs, most of them a mixture of Mediterranean, Californian-style houses.

The country around Lima is all irrigated--there's practically no

McL: rain in Lima at all. All the vegetation comes from irrigation made possible by the streams from the Andes. But you have beautiful gardens, and really quite a lovely city; of course it now has big, modern hotels, fine shops, ugly tall buildings and horrible traffic. But I don't find it nearly as attractive as it was twenty years ago.

N: Did you find that the mine people mingled with the residents in Lima?

McL: In those days, not very much. They kept very much to themselves. The older families and the wealthier people in Lima were pretty--oh, they had their own lives and rather snobbish ways.

N: A sort of Spanish pattern of living?

McL: Yes. Unless you had some definite introductions, you really didn't see very much of them. The average mining man in those early days in Peru really had little or no associations with what you might call Lima society, although I had many friends there and got around a little bit through other connections. I liked Lima very much when I was down there later as manager. Of course I then had a much wider acquaintance in Lima, and at that time many associations with high officials in Lima among whom I had a number of close friends. One of my old friends down there was Pedro Beltran, who became Prime Minister of Peru. He is the owner of La Prensa, one of the major papers there. He married a San Francisco girl, Miriam Kropp, a Stanford graduate.

Miriam Kropp and Marian Sproul, you know, Bob Sproul's daughter, went down to Lima for jobs in the Embassy during the second World War, while I was there with the Cerro de Pasco Company as Vice-President and General Manager. So I saw the two girls quite often. Marian married a young lawyer in the Embassy, Vernon Goodin, and Miriam--we called her "Kroppy"--married my old friend Pedro Beltran. He was Ambassador, later, in Washington. No, I think he was Ambassador before he was married.

N: These old associations keep coming back.

McL: Oh, yes. They're still very close friends. A good many are, down there. But I'm getting 'way ahead of the game; this is part of the Cerro de Pasco story.

The Cerro de Pasco Corporation

N: Would you be interested in talking about the Board of Directors of the

N: Cerro de Pasco, and the corporation and its financing?

McL: Cerro was a close interest of mine for quite awhile, though it's been about fifteen years now since I was on the board. The Cerro de Pasco Corporation was not controlled at the beginning by as close a group as Homestake was. The original syndicate was organized some years after Senator Hearst's death. The Hearst estate went into it on a substantial scale but as one member of a larger group, so that its participation was not as big as the Hearsts' interest had been originally in the Homestake. Edward Clark, who was the manager of the Hearst estate (that was Phoebe Hearst's estate) was in the syndicate, I believe, as their representative. Then, in the various developments of the enterprise, a corporation was set up and the original syndicate disappeared. He continued as a vice president, and eventually became president of the Cerro de Pasco Copper Corporation. He served as president of Homestake also for many years.

N: Was this simultaneous? Was he president of both at the same time?

McL: Yes, he was for a time. But he was really acting as a business executive rather than as a technical manager. He always placed great authority and trust in the people who were actually running the enterprise, such as the general manager in Peru who was generally a very active and dominant person.

At Homestake the chief operating officer was called the Superintendent until the end of the 1920's. The men who held these positions had much more independent power then than they had later, when better communications made it easier to direct affairs more closely from New York and San Francisco than it had been in the early days.

So then the Cerro de Pasco Company became a public company and it evolved into a big organization in which the original syndicate owners rather faded into the background. Some stayed on as members of the board, and some disappeared. In the present Cerro de Pasco Company I doubt if anybody is on the board today who has any relation to any of the old syndicate members.

N: Who comprised the syndicate?

McL: The Hearst estate, and the Haggin group, and the Vanderbilts were in it, and a number of others. I'm not quite sure.

N: I was just interested in the spread.

McL: Yes. That was rather before my time.

N: Were there Peruvian interests?

McL: No. This was entirely American. That is, the idea of trying to bring in the nationals in these enterprises was never thought of in those days. And the great trouble is there isn't the money in those countries on the scale needed to develop really major mining enterprises. There wasn't then and there isn't now. The greatest Peruvian wealth was in sugar and cotton estates and mining, except on a modest scale, didn't attract them, at least since the days of the early Spaniards. But today they are so intensely nationalistic that in most new enterprises, if you're there at all--if you have the nerve to be there at all--an effort is made to have participation by the people of the country in some way. But it usually means a relatively free ride for them or a government agency. It's not often that any private or public organization in those countries pays its share of the early speculative expenses.

N: I see. And the, let's say the originators, of the syndicate do pay their share?

McL: Oh yes. They put up their money and they pay their share at the stage when the success of the venture is likely to be far from certain. Of course, when a company was made public and put on the market, the original participants would undoubtedly retain a big chunk of the stock as proper compensation for what they had contributed in the beginning and the higher risks they had taken. It would depend a great deal on what they had found as to how much they had to contribute to raise the necessary funds from financial groups or from public participation.

Financing and Participation

N: Is that governed by legal structure or just by the market?

McL: Well, it would be both. For example, suppose a syndicate got together and put up, perhaps a million dollars to do a piece of exploration and they found something that was, oh, marginal--not very good, not very bad. In order to get the extra millions they would need, they probably would have to give a very large share of participation to anybody who would be willing to risk his money in the next stage--to complete the exploration, develop the mine and provide the plant. But on the other hand, suppose that in the initial work they really hit something extraordinarily good. Then when more money was needed (if they weren't able to put it up themselves) they could probably get it on attractive terms. Well, then they would have something better to sell.

Of course there are lots of legal ramifications of what you can do and what you can't do, but the basic thing is to find something very

McL: good. Of course it would be quite illegal to--well, it would be a fraud to have something that was very poor and not reveal all the facts about it. But on the other hand, you might have spent a million dollars on an ore deposit and it was just--oh, it was something that you didn't want to throw away, but it was something you didn't want to spend any more money on. It might be a great risk to spend more money. If you make all the facts available, somebody might be willing to take that risk for a half interest, or 90% interest--much more than they could get if the initial work had revealed an obviously valuable ore deposit.

N: Does this sort of marginal situation occur very often?

McL: Oh yes. The Homestake Company has been in exploration in Peru the last few years as a managing partner of, in a sense a syndicate, with some other very much more powerful organizations, some oil companies, who have more money than we have to put into exploration. In the course of the work, we have been able to get hold of a couple of mining properties in Peru that have a fair chance of being developed into what we call porphyry coppers, that is, deposits of low grade, disseminated ore that can be very profitable if mined on a large scale. But the drilling is only partially done, and the ore is of such a marginal grade that it would have to be extremely big to be worth anything.

It's a very costly thing to go on exploring, so we were more or less at a stage where one of the partners was becoming reluctant to go ahead, and we certainly didn't want to put more of our own money into it beyond a certain limit. Unfortunately, it has become more and more difficult these days to find anybody willing to put large sums of money into ventures of this sort in Peru. In fact the partner who had been putting up a substantial share of the money just said, after some negotiations, that he wanted to sell his share to us, and we weren't interested. We were trying to find a buyer for it. Now he's just abandoned his share, walked out. We have it all, but we certainly would not be in a position to put up all the money even if we felt sure of the future of Peru. We would have to find somebody who would be willing to supply the additional funds needed for further explorations, and there would have to be a matter of negotiation as to what share of ownership they would acquire for their financing.

That would be a legitimate way to go at it. It's an interesting prospect, but nothing that a person who can't lose several million dollars should ever go into--even though eventually hundreds of millions might be made from it.

N: Is it partly a question of timing?

McL: The timing is political just at present. The climate is so bad in Peru, where the government, which is very nationalistic, has insisted that some of the big companies that have large reserves of this type of ore definitely established but not yet equipped with the huge plant needed for successful operation--where millions have been spent on exploration to prove the existence of several hundred million tons of such and such grade ore--now are told that after a certain date in the rather near future, if they don't submit definite plans to develop and operate those holdings with complete financing guaranteed they'd lose their titles. Well, in some cases, that would mean raising $200 to $300 million or more for providing the huge plant necessary for such large scale operations, and it's very hard to get $200 or $300 million from anybody to spend in Peru where you have a government that might take away titles arbitrarily. So now I really think the Peruvian government is virtually confiscating several of those properties, because the original owners could not or would not come up with that type of money.

But what is the Peruvian government going to do? Where will they get the money? The Russians might be willing to put it up, but Russia never offers anything without strings attached. They'll find themselves in a much worse position than they were with us. Now the Japanese have put up some money. They're avid for metallic ores to support their own economy, but they're apt to take a pretty cool look before spending sums of this magnitude.

We have another little vein mine in Southern Peru. Oh, a few millions have been spent in developing it, making sure that there is an assured ore supply of adequate grade. The next step would require some tens of millions. It's a relatively small thing. The Japanese are participating in it in order to get the concentrates the mine will produce, and we shall run it. But all those things are balances, where you review first the geology--the known ore supply and prospects for more ore--the engineering, and then the politics, and of course the market and the financing.

Next door you have the awful example of Chile, which has gone completely Marxist, or Communist, actually taking over tremendous companies, and paying the owners far less than their true value and probably with Chilean bonds, at that, which the companies will have to accept on their face value, even though eventually they'll be worth a small part of that figure.

N: You're referring to the election of Allende?

McL: Yes. Well, in the meantime the great Anaconda Company has practically lost its Chilean properties. Over a billion dollars must have gone into their enterprises, and of course they have had big returns from them, but still they had the titles and the Chilean government was getting by far the overwhelming percentage of the profits in taxes. But no, the Chileans wanted to take it over and run it.

N: This was a sort of ex post facto act in the sense that what was done earlier was then done legally, but it's no longer legal now?

McL: Oh, it was all legal. All completely legal. Basically, any sovereign government has the right to expropriate private property if they pay for it. Well, they take it over but they pay with bonds that they claim have equivalent value to sound money. But unfortunately at best they are no safer than the local currency. And you know what is happening to that. Governments seem to find legal ways to commit fraud. That's what it really amounts to. That's been practiced in a great many places. These are days when it's very hard to have anybody put up money needed to finish a new mining enterprise, or even to start one any more.

N: Do you think that this means that the major explorations based financially in this country, are not going to be permitted in other countries any more?

McL: The climate for such investments surely has changed. They'd still like to have us come down and take risks and spend more money, but on much less attractive terms. If we spend the money, at the early stages, we are regarded as benefactors. But when a venture becomes profitable, we are called the exploiters of resources that belong to the people. So why would you take risks, in the light of the record?

So the money's dried up. It's a big power struggle. Those countries don't have the capital to do that sort of thing. As for the rich people in those countries, I'm sure a great deal of their money's now in Paris.

If they're wise they get their money out of the country. But people who have great landed estates they can't take out are suffering very great losses. Those are being taken over, and of course paid for in this pious way, but really not effectively paid for. And a great mining and metallurgical plant is a fixture that can't be moved when threats of confiscation are made. Oh, it's a form of revolution.

N: Yes, I can see this. Redistribution of wealth. When you have enormously poor big populations, this is a terrible problem.

McL: I am afraid they'll always have their poor. They are simply changing bosses. When they take over a great sugar estate, it doesn't mean that the land holdings can be broken up, and given to the thousands of employees or neighboring poor people, because you can't operate a great sugar enterprise in small particles. So it'll have to be operated by a government-controlled agency, as a government corporation. So you just shift the emphasis and you have a group of bureaucrats running the enterprise, and probably being far more ruthless than the original owners in relation to the labor that works on it. The same thing will happen if the mining enterprises are taken over.

One of the great agricultural exports of Peru is sugar, and sugar doesn't lend itself to small scale farming. It's a great enterprise with a huge extent of irrigated land--acres and acres and acres of sugar cane and a big mill. Or it's nothing. Cotton is very much the same things. You'd certainly have poverty if you had a few acres of people growing cotton and picking it and sending in a few bales. Sugar cane must be grown on big tracts--hundreds or even thousands of acres in size, and handled in large quantities through a central plant to make it profitable. So I'm very sure that any nationalistic government that takes over those enterprises, takes over such property, will simply have to run them the way you'd run any big industry. Except in that case it would be government-run.

Just as in this country now the railroads are in such a bad state largely due to excessive regulation and union restrictions that the government might have to take them over. But if it does the railroads would still be run by a small group of people. They would be government officials, probably even less competent than the ones who are doing it now. But the people don't do it. This business of saying "the people"--as a mass they can't do anything. Even a socialistic government has to depend on an elite with skills to survive in this age of complicated technology.

N: You're suggesting that willingness to venture investments into certain areas is changing. Does that suggest that people are looking for more safe areas to invest in?

McL: Yes. Most mining companies and oil companies are interested in exploration, and willing to take the risks inherent in such work. The political risks, however, are becoming far more worrisome. Places where you can put your money with confidence that legal rights will be respected are becoming rather scarce. They are almost limited to the English-speaking world: Canada, Australia, South Africa and New Zealand, and even some of them are not as hospitable to free enterprise as they once were.

Mexico is enjoying a stable government, and a fairly good boom. Exploration is quite active in Mexico. There taxes are prohibitive,

McL: however, unless the enterprise is 51% controlled by Mexicans. But money is plentiful in Mexico, and the economy is still essentially capitalistic. They have their own capital available though mining ventures don't attract much of it.

N: Do you foresee this happening in any of the South American countries? The large ones?

McL: Well, Brazil and the Argentine could have that degree of power, financial power. I doubt if many others would. Venezuela, if the government were stable enough and the revenues from oil were used that way, could also do so, I suppose. But I'm not familiar with developments there.

IX EARTH MOVEMENT AND MINERAL DEPOSITS

The Peruvian Earthquake (1970) and the Gorge

N: Speaking of Cerro de Pasco, did you say that you had been in Peru in the area where the major earthquake was?

McL: Yes. I was up there in 1920. I went up to see a copper deposit called Magistral, which was above the town of Conchucos, fifty miles or so to the north of the Callejon de Huaylas. This was a small copper mine that was rather intriguing, but it didn't seem big enough to be worth spending much money on. But I went in twice to see it that season, and on the second trip I rode back all the way from that place in Ancash in northern Peru to Cerro de Pasco, overland through the Callejon de Huaylas and then across the range by way of the famous gorge called the Yanganuco. I was about five weeks on the road including days spent at a number of mines. That's an extraordinary region in Peru. The Santa River runs from south to north for a long distance between two ranges of the Andes, one on the east-the continental divide-with many peaks over twenty thousand feet, called the Cordillera Blanca (the white cordillera) and the one on the west, which goes up to fifteen or sixteen thousand feet, called the Cordillera Negra, because it has no ice or glaciers.

Where the river leaves the Callejon, it cuts through the Cordillera Negra in an enormous gorge called the Canon de Pato and reaches the coast north of Chimbote. The canyon cuts down to about two thousand feet through highlands that are around fifteen thousand feet. It's really one of the deepest gorges in the world.

A start on building a railroad up that canyon was made back in the early days. It was not completed until the late '20's, a meter-gauge railroad, built through the gorge with an extraordinary series of tunnels and bridges. When I went in that first time, the grade had been finished some years before that, with many tunnels. They were then building the bridges and were laying rails. We went to

McL: the rail-head and then continued on horseback through the tunnels. It was quite a job getting mules across some of these railroad bridges with just a couple of planks across the ties. The railroad at that time went only part way up this gorge.

The railroad was eventually completed to a power site called Huallanca and then continued into the thickly settled Callejon. Much of it--and many of the bridges--were destroyed by the floods that followed the earthquake of 1970 and I imagine it will be abandoned.

We left it where a large tributary from the north came in--the Chuquicara River--and crossed the big Santa River on a swinging rope bridge. Then we started off to the mine I mentioned. On the way back I rode up the Callejon de Huaylas itself, and stopped and spent nights at the little towns of Huaylas and Caraz.

From Huaylas, I spent a memorable couple of days on a trip to some mining districts in the Cordillera Negra to the west. It required a lot of climbing and walking as well as riding. The weather was perfect and I had a glorious view from a sixteen thousand foot peak of the entire length of the ice clad Cordillera Blanca across the Callejon de Huaylas to the east. All the great peaks--Champara, Huandoy, Huascaran and dozens of others--were without clouds and clear for a hundred miles. To the west, I could see the fog bank over the ocean--a tremendous range of altitudes.

In 1970, fifty years later, Homestake was drilling a possible porphyry copper deposit in this region at the time of the earthquake. Pashpap is the name of the prospect. Since then, little has been done, in part due to difficulties of transportation created by destruction of roads, but also on account of lack of funds available for the project.

I passed through Yungay and spent the night in a little village above it, called Yaneima, at the very foot of Huascaran. Yungay was the town that was completely wiped out by an avalance in the recent earthquake.

The gorge of Yanganuco that I mentioned, is deeper than the Yosemite. I remember a tremendous cliff on the north side that I think is even higher than El Capitan. There's a large lake in the valley now, as there once was in the Yosemite in the glacial period. On both sides of this gorge the mountains rise to elevations of over twenty thousand feet. They are covered with tremendous ice fields, that are hanging over the valley in a most precarious way. So you might imagine a Yosemite with tremendous glacier clad mountains rising on both sides above the cliff, with glaciers practically hanging

McL: over it.

What I suspect happened in this earthquake is, that either there were some avalanches of rock off the walls, or else great avalanches of ice that broke loose and came down into the lake and formed a huge wave in the lake that washed out the barrier, the moraine.

N: Was that a natural barrier? Not a dam, then?

McL: No. It was a moraine where the old glacier, you see, had made a natural dam. There are many, many lakes all through glaciated mountains like that. I don't know, but I would guess that the great flood was due to an avalanche falling into the lake and the washing out of the dam--the moraine--which caused the lake to empty into the Callejon, which is not a flat-floored valley, but a long trench bordered by a series of coalescing alluvial fans. The towns are all on the alluvial fans, just the way the towns are in southern California in so many places.

I can imagine a flood of this sort came down and there was just no place to go. Yungay was on such a fan and was completely wiped out by the flood of water carrying mud and rocks and ice. That would be my guess as to what happened. Of course there's no report on this yet.

[Subsequent note: This was a reasonable guess, but it isn't what happened. The avalanche that destroyed Yungay fell off the southwest face of the great peak of Huascaran (21,700 feet) and descended directly toward the town in the Callejon and not into the Yanganuco gorge. It was a mixture of ice, boulders, and mud--a great flow that came down with incredible speed--but fortunately, it didn't fall into the lake and wash out the moraine as I had feared when I first heard about the disaster. My version would have been even worse.]

N: These enormous variations in elevation that you speak of--under other circumstances could this be used to generate water power?

McL: As a matter of fact, a huge hydroelectric plant has been built in the great gorge of the Santa River. I think it's called Huallanca. Tunnels have been put through in a place where there is a big drop in the river. The Santa is by far the largest river on the west side of the Peruvian Andes.

But the trouble with it is, they've built this huge plant and there really isn't the market for that tremendous amount of electricity up there. There has been a lot of effort made to develop industries at the port of Chimbote, which has one of the best harbors on

McL: the Peruvian coast, but it's just desert country around it. I haven't been up there for years and years, but when I was there the port was just a very insignificant little fishing village; like most of these little places, rather forlorn. But it was the terminal of the railroad that went to the north and then up the Santa River, and eventually into the Callejon de Huaylas.

Now the age of railroads is over, and automobile roads reach into the Callejon from the north, and I think some other ways, too. Those are the roads that were destroyed in the earthquake, so people were isolated in there. It's apparently still very hard to get any help to them.

There are tremendous electrical power possibilities through there, but far more than any market would take at present.

N: So it really awaits the development of an industry that would make use of the power.

McL: Yes. If there were any great low-grade copper or lead or zinc mines in that region, then you could have a big metallurgical works, using a large amount of power down on the coast. But while there are lots of mines through that region, there's nothing up there so far that would be regarded as a major mine. With the available power and a good port, metallurgical plants dependent on concentrates shipped in by sea might well be developed on a big scale at Chimbote. With cheap power and a fine harbor such enterprises can be competitive--but there are little or no ores or concentrates yet available from local mines.

N: When you were prospecting--if that's the right word--in this area, was this under the auspices of the Cerro de Pasco?

McL: Yes. There are the possibilities of some quite big mines in that general region. The Homestake Company that I've been with so long was also doing exploration work there. We had a party up in the Cordillera Negra that went through the earthquake. One man, I think, was hurt a little bit. We don't know how. Possibly by a rolling rock. We've been doing some drilling up there in the Cordillera Negra and possibly we may be on the trail of something big.

N: Were the actual Cerro de Pasco mines--I guess it's a complex of mines, really--

McL: Yes.

N: Were they specifically damaged by the earthquake, do you know?

McL: I don't think so. The big shake didn't reach that far south. I haven't heard, but I imagine Lima felt the shake and so did Cerro de Pasco. But it wasn't a disastrous shake there.

Some California Earthquakes

McL: Well, last night did you feel the earthquake at 8:30? [June 11, 1970]

N: No, I didn't. I miss them all.

McL: There was quite a sharp earthquake in Danville, the paper said this morning. Here it was a bump and this lamp went back and forth like that [rattling sound]. Just a bump! [Laughter]

N: Well, of course, as a geologist, you must find all of this earth movement very interesting.

McL: Yes. Here we are, sitting right on the Hayward Rift! But this apparently was a shake on the Calaveras Fault last night that shook up Danville. So we're getting ready for our big one here, I think.

N: So they say. Mr. Steinbrugge thinks so. Perhaps you've seen his little book about earthquake problems.

McL: Yes. I really think we've built up a disaster potential here that is just appalling. If we had an earthquake like 1906, the damage and losses would surely be far greater.

N: How could one have avoided this hazardous situation?

McL: By not having so many people. [Laughter] Not having such big cities. Here we are with practically no transportation exept automobiles, and think of what would happen if we had a big disaster and a big fire, and millions of people were trying to get out of the city. It has been so stupid of San Francisco ever to put up these tall buildings. I don't think the tall buildings are going to collapse, I think the engineering's good enough for that; but it could be a terrifying experience to be in them, and they also could shed a lot of granite veneer and things of that sort they've put on them, and glass--which would make it very unpleasant to be out on the street.

N: Yes. Of course one wouldn't want to be on the 30th floor with the elevator a little askew!

McL: No! No. I haven't been in one of these buildings in an earthquake.

McL: I missed the one--when was it, March? Back in the '50's? which was quite a shake. We had the 26th floor of the Shell Building then. I happened to be driving to the airport at the time. I didn't feel the earthquake at all. But they told me the building developed an alarming sway and it was so terrifying that we had to let most of the staff go home.

The girls were hysterical. One of my friends said it felt very good when the building started to sway back.

N: I'm sure it did. [Laughter] You were saying that automobile transport is not the best in the case of this kind of disaster. Would you think rail transport would be more reliable?

McL: Well, it would certainly help. But you could just imagine the way these roads would be clogged if people had to get out. Even the commuters are clogging the bridge now, with the strike of the buses. Now there are no ferries. In San Francisco, in the big fire, many people used the ferries, of course, to get out of San Francisco. Now everybody would try to get out on two bridges! Or down the Peninsula, depending which way was the easiest way from where they were.

I think it's rather an appalling situation.

N: Yes. It's hard to do something retroactively, isn't it?

McL: I don't know what one could do. I think having BART [Bay Area Rapid Transit] would be a big help, but I'd like also to see ferries put back on the Bay. You can move lots of people by ferries. And then, it would relieve the bridges. I really think we're going to come to it--having parking places near the terminals and fast ferries back and forth, instead of building more bridges. And particularly some big ferries to move trucks even to the upper and lower bays and take some of the load off the bridges and highways.

N: Yes. In this I think the engineers and the ecologists agree.

McL: Yes. Something I've been saying fifteen years. [Laughter] I'm very pleased with myself.

The Pacific Belt of Fire

N: You should be! I was wondering when we spoke about Peru a little earlier, has that area been subject to earthquakes over the years?

McL: Oh, yes. It's part of the Pacific zone of earthquakes. There's a great series of mountain arcs and deep trenches of depressed sea bottom running right along the west coast of the two Americas, around Alaska, down through Japan, and so on. It used to be called the Pacific Belt of Fire, because there are so many volcanoes along it. And that's one of the major earthquake belts of the world. It all fits in now with these new ideas of the shifting of the continents--the slow creep of the continents. And we're in one of the active spots, here in California.

N: In which direction are we creeping? Westward?

McL: I think the continent as a whole is moving to the west, with the ocean floor going in under it, but the actual faults here in California, like the San Andreas fault, show a horizontal shift, with the west side moving north. That is, in the 1906 earthquake, the snap on the San Andreas Rift definitely moved the west side to the north.

The movement is in the same direction on the subsidiary rifts, like the Hayward Rift that we're on right here. The Calaveras Rift is a fracture in the earth along which the movement in geological periods is to be measured in hundred of miles. But of course that's over millions and millions of years, whereas one little shift--a movement of a few feet--would be more significant to us as an earthquake.

N: Yes. Are you of the school that suggests that a number of minor shocks tends to relieve some of the pressures, or doesn't that work against a major earthquake in your view?

McL: I'm not a seismologist. I don't know. Probably they don't either. I think, just as a non-expert in that field, you can look at it two ways: one would be that the minor shocks are relieving the big strain, and that's fine. And the other, the minor shocks, the little cracks, may indicate that a really big strain is building up and we had better get ready for a major shake. I don't know that anybody can say really what it means.

There is a creep going on here, right now. There's a slow creep of the crust, with the west side going north. And there are little, tiny shifts, such as the displacement reveals in the Strawberry Creek culvert that goes under the stadium. That tunnel has cracked, and there is a shift, a very small one, but measureable, of the west side to the north on the Hayward fault. The Western Pacific railroad line, as it turn and goes into the Niles Canyon, crosses that rift. And the rails show a slight displacement.

McL: Well, now, one theory is that this slow creep is relieving the strain with little, minor jiggles. When, or if, a great strain builds up there is likely to be a sudden snap with a relatively large movement. If the strain is relieved in a series of little tremors, you might not have the big one; but on the other hand, these little adjustments that really don't show any big displacements, may be just little tiny preliminary quivers before the complete release that causes the big earthquake. I don't see how anybody can tell yet. Seismologists undoubtedly could give you some elaborate reasons.

N: There's certainly great interest in the problem of earthquakes in the Bay Area.

McL: Oh, there certainly is. It's a critical problem.

Formation of Mineral Deposits

N: When you were, a moment ago, describing the Pacific Belt of Fire it sounded as though you were also mentioning areas that had great mineral deposits. Is there a relationship between the areas in which there are mines and volcanic activity?

McL: Yes. These are belts where throughout geologic history there have been many drastic changes, where successions of sedimentary rocks have been intensely folded and overthrust, and magmas or the molten silicate material from deep in the crust introduced in much greater profusion that in areas of the earth where there has been little disturbance.

These magmas that come from deep in the crust may have started as melts high in iron and magnesium that if cooled and crystallized would form the variety of rocks we call peridotite, but as these masses slowly rose, they changed in composition as one component after another separated out or assimilated some of the solid material of the crust, so igneous rocks of different sorts are formed as the magmas crystallized or solidified. And each is the result of the conditions that were imposed on the magmas or melts as they rose from the depths of the earth and crystallized or solidified as they cooled.

So we get coarse grained rocks like granite from magmas slowly cooled at considerable depths and glassy volcanic rocks formed at the surface like rhyolite and obsidian, both of which are high in silica--many light colored rocks as well as the far more abundant dark lavas such as basalt.

McL: And there are cases where rocks formed from very deep-seated melts are now exposed at the surface where erosion has revealed them, such as this rock that we have very commonly in California called serpentine. It originally was a molten mass, high in iron and magnesium, probably forming peridotite that became altered with water in the upper regions of the crust, and converted into this peculiar greenish rock, serpentine. Those rocks--unfortunately not in California, but in many other places in the world--are associated with nickel and the platinum metals, and those metals are most commonly found in zones where such rocks--called ultrabasic rocks--are abundant.

The prevailing theory is that most of the metal deposits were derived as final products in the crystallization of these molten masses. That the most volatile constituents--the last fluid elements that came off--contained higher concentrations of the metals, which were deposited as veins where the solutions moved out and up along cracks in the solid enclosing rock. Or they may have penetrated and spread through masses of shattered and broken rocks and deposited the metallic minerals in numerous seams, so that a large body of rock--not merely a narrow vein--became a valuable ore.

So there is an association of ore deposits with these belts of igneous activity and intense structural deformation. That is, the whole cordillera of the Americas, from Cape Horn right through to Alaska, is a belt in which you find more mineral deposits of this sort than, let's say, you do in more stable regions.

Of course, there are some important ores even in the Mississippi Valley. There's a lot of lead and zinc there in Missouri, but, in general, these belts of disturbance and igneous action have been zones of metalliferous deposits. However, it is really difficult to make any generalizations about where ores are or are not without having to point out important exceptions.

N: Thinking just a moment, then, about the Homestake Mine in Lead--is the Lead area similar to that one that you've been describing?

McL: Oh, that deposit occurs in the Black Hills that structurally is something like a blister on the plains a hundred miles or so east of the Rocky Mountain front. It could still be considered in the broad belt known as the cordillera of the two Americas. It is really east of the Big Horn mountains, which could be considered the Rocky Mountain front. But it is still in the broad cordilleran belt, way out on the eastern side of it.

The deposit at the Homestake Mine however is in very ancient basement rocks, and I think the ore and the gold ore of the same age

McL: as those very early rocks and was probably formed long before the geologic events occurred in the zone that borders the Pacific. That is, it is pre-Cambrian. That is the term for the basement rocks. That is, for formations earlier than the sediments that formed the rocks of the Cambrian period in which the first abundant fossils occur. These older, very highly folded, very much altered rocks--the schists, gneisses and rocks of that sort were formed in a very ancient time when conditions on the earth may have been not at all like those that existed later. Continents may have been in other places and the zones of folding and deformation followed courses very different from the later ones. So we find older belts with distribution of ore deposits that don't fit into the patterns I was talking about.

Another great region with many ore deposits in North America is the Canadian Shield--that is the big area of Canada which forms a broad arc right around Hudson Bay and down into Ontario and Quebec in which these older rocks--the pre-Cambrian rocks--are now exposed at the surface. There are many, many great ore deposits scattered through this region, most of them, however, in rather distinct zones.

I don't want to give you the impression this belt of the rim of the Pacific is the one great mineral belt of the world, but it is a major zone of deformation and igneous action in which ore deposits are particularly abundant. They are much younger--geologically speaking--than the ore deposits in the Canadian Shield or the Homestake in the Black Hills. Perhaps some are still being formed in the Pacific belt for it is an active region, geologically speaking. But the old deposits of the pre-Cambrian assume quite different patterns of distribution.

Then there is a theory that is a bit disturbing to most American geologists that have grown up in the last twenty or thirty years, which is gaining more and more acceptance: that many metalliferous deposits in sedimentary rocks were in some way or other derived from the waters in which the enclosing rocks were laid down. That is, that some of these deposits actually are of sedimentary origin, not of igneous origin or derived from melts.

N: I see. And why does that disturb American geologists?

McL: Because in the early days in the West most of the deposits that were found were closely associated with igneous rocks and I am afraid we all got the impression that most deposits were of that sort. Recently hot brines have been discovered in certain deep basins in the Red Sea, where the metals are being deposited with the sludge and the muds. There you have a deposit being formed which really is a sediment in sea-water, carrying rather interesting quantities of metals.

N: Now when you say, "hot brine," what does that mean?

McL: A brine is a salt solution like sea-water, and these are warm.

N: Oh, not radio-active?

McL: No. Just plain hot. And strangely enough they contain such a high concentration of salts that they're heavy and in spite of their heat, they stay at the bottom and collect in basins.

Well, now you can also say, though, that that's simply a stage in the concentration and deposition of the metals and that they may still have been derived from emanations from molten material, with which I think everybody would agree.

N: The waters are picking them up somewhere.

McL: Yes. But their distribution and their deposition is really a sedimentary process. So both theories are correct.

These particular metal-bearing brines actually occur along another belt of disturbance in the earth, marked by the depressions of the Red Sea, the Dead Sea and the Rift Valleys of Africa where there has been a cracking and a pulling apart of the continent, with the upwelling of heat, and molten material from the depths. However, it hasn't resulted in as distinct a zone of mineral deposits as is found in the American Cordillera that borders the Pacific.

Geologic Sleuthing

N: I suppose the theory of how these deposits came about guides your thinking in finding what has been deposited?

McL: Oh, yes, in a way it does. It all guides your thinking, though some of the theories are such broad generalities that they don't help you too much! [Laughter]

N: I see. What is the most important element in being a good geologic sleuth, let's say--in finding the metal that you're looking for? What do you need for this?

McL: There are a great many different signs. Most of these deposits are accompanied by changes in the surrounding rocks, so even if you fly over the country, the places where there's likely to be mineralization are fairly conspicuous from the rather abnormal coloration of the rocks.

McL: In desert countries and in the high Andes where there isn't much vegetation, the ore deposits--the zones of mineralization--are rather conspicuous in that way. But such showings could also be created by rather worthless mineralization--iron sulfides and things of that sort could also cause some of these conspicuous zones, so you can be very disappointed going after some of them and finding nothing.

It's unlikely in those countries for the copper, lead and zinc to come in without enough associated effect to give you a rather interesting-looking region, but that's a pretty broad target, too. Then you have to get down to the details in specific places where you can find fractures and veins along the fractures, or association of ores with other structural features, and look for signs of mineralization of that sort. Most ore deposits are greatly altered when they outcrop at the surface and their superficial portions may contain a number of conspicuous and distinctive minerals where oxidation and weathering penetrate the ground. In most cases, the ore minerals are transformed into oxidized forms: metallic sulphides are broken down and sulphates, carbonates, oxides and even native metals formed. Soluble compounds are gradually leached out so that under certain conditions a metal may almost disappear in the oxidized zone. Copper has a tendency to behave that way, so that you get a thick layer of altered rock over a copper deposit in which there may be very little copper left. Such layers over the porphyry copper deposits are called leached cappings.

On the other hand, in certain other environments, where there might be some limestone around, copper in the oxidized zone tends to form minerals like malachite, which is a beautiful green or azurite, which is a beautiful blue--both of them so distinctive you couldn't miss them if you are at all alert for such signs. Most of those deposits have been found because they are so easily recognized.

N: These clues that you've described would be meaningful just to someone who had had geologic training. So is that the basic training?

McL: Well, I think geologic training certainly helps, and lets you see clues that are more subtle than the clues that a good prospector would note, but it's rather disconcerting that one finds few ore deposits on which somebody else hadn't done a little digging in the early days.

Most of the Peruvian deposits, like the Cerro de Pasco, or Potosi in Bolivia were old mines that were worked back in the 17th century by the Spaniards.

N: And were you saying that they were looking for gold and they didn't recognize--

McL: The Spaniards may have been looking for gold but they mainly found silver in Mexico and Peru. There was not too much gold. The Incas had a great deal of gold which they probably washed from streams, but there really have been no major gold mines developed in the high Andes--a number of small mines, but no major gold mines. The great wealth of the Andes and Mexico was really silver.

Today you have to use much more subtle means, because the obvious things have been found. For example, in Canada one of the major enterprises of Canada now is the great nickel district in Manitoba, at the town now called Thompson, which only fifteen years ago was just empty country of, you might say, moose pasture [laughter]. A great nickel belt occurs there, but it was very inconspicuous at the surface. It is in a region of lakes and forest, and much of it is covered by later glacial deposits; sands, clays and gravels. You could go over it and over it and over it, probably, without spotting it.

It was discovered by recognizing that a type of rock, the peridotites--these old, ultra-basic rocks, we call them, with which nickel is often associated--occurred there as a zone. Outcrops were scarce, but enough to attract attention.

Then the region was prospected by geophysical methods from the air, measuring the change in magnetism and the change in electrical conductivity, which indicated smaller targets that might be sulphide ores. This was followed up by geophysical work on the ground.

Some sulphides of nickel were noted in a couple of outcrops, but most of the great ore bodies, we now know, were completely concealed under lakes, swamps, glacial sands, and so on. Diamond drill holes were eventually put down, and results were encouraging enough to keep on drilling and sinking shafts that discovered a series of major ore bodies. Finally after a few years they really hit the jackpot, when high grade ore was found in a body that has no surface showing whatever. So now there is quite a city up there. I don't know how large it is, but it is the second city in Manitoba, maybe 15,000 people, with a big smelter and mines, and an airport, highways and a railroad.

N: Is this the nickel company in which you are involved?

McL: Oh, yes. I'm going up to some of the mines in a couple of weeks now.

N: I see. And these finds are really nickel--primarily nickel?

McL: That deposit in Manitoba is nickel. There's always a little of some other metals, but nickel is dominant up there. The great mines of

McL: the International Nickel Company are at Sudbury, in Ontario, where the company started. That's nickel-copper, and with a very substantial amount of platinum metals. That's a very famous geological spot, and the nickel company generally known as INCO is the major company there by far. Falconbridge is the other big company in that district.

Of course that's a fascinating geological place, and it's interesting to see how theories have grown up over the years about it, starting with certain rather simple theories of the nickel and the copper separating out from a great molten sheet and settling by gravity to the lower contact. Now that theory's had to be modified. There may still be some truth in it, but present theories are going a long way beyond it.

One of the most entertaining theories now is that the great oval area known as the Sudbury basin was formed in pre-Cambrian time--early in pre-Cambrian time--by the impact of a huge meteor, an asteroid. And, strangely enough, the theory has a great deal to commend it!

N: Really? [Laughter] Outer space isn't so far away, then?

McL: No!

N: Would this impact of the asteroid be an entirely different theory from the magma theory?

McL: No. The impact was so great that it caused a great rupture in the earth's surface, and a welling up of deep material--or so at least some geologists say. It is even urged by one or two people that the nickel and the iron and the copper came in with the asteroid. That is a reasonable possibility because many of the little meteors that come through to the earth are iron nickel. None, however, is known that contains copper.

N: There are some legends, aren't there--Latin-American legends--that the metals came from the sky?

McL: You've seen these meteors that come through. There are two sorts of them. One sort is a rocky material and the other is really an iron nickel alloy--most of them are the iron nickel alloys. So it's not entirely unreasonable that a huge chunk of that stuff could have come in, and could have been the source of the iron nickel. But I don't think many of the people who've studied it in great depth believe that.

They believe--the theory is--that the impact created structural weaknesses, and a long sequence of events during which the deep material welling up from the depths of the earth took advantage of this

McL: peculiar broken region to make this very unusual almost oval cup-shaped mass of rock that's called the Sudbury Intrusive. They even call it the nickel intrusive. The old theory was that all the nickel really came out of that intrusive.

N: It just suggests that almost any force that alters the balance, or makes a shift, causes some reaction--

The Theory of Continental Drift

McL: Yes. The earth really is a very mobile thing, if you give it enough time. These zones, places where some drastic event has occurred, are places where you can get these unusual concentrations of the metals. This extraordinary theory of shifting continents came out back in my days in college.

There was a book by an Austrian or a German named Wegener about the continental shifts, and he made an interesting plausible story about it, but it seemed so extreme that very few took it seriously. His idea was that North and South America pulled away from Europe and Africa over a few hundred million years, relatively late in geological time and he matched rocks on each side and the shapes seemed to fit.

And now, much later, the existence of a mid-Atlantic ridge has been established and carefully worked out by soundings. It appears to be a belt where the crust has pulled apart. There is a distribution of sediments on each side of it and deposits on the ocean floor get progressively older as you go out from the ridge. Furthermore, the ridge has a peculiar trench along its crest that seems to be a slumped trough where the crust actually separated and allowed a block to slump.

The Atlantic ridge is also marked by a number of volcanic islands, starting with Iceland and running down to St. Helena. The theory is now, I think, practically an accepted theory--that there is a slow creep in the earth and that plates of the crust are separating along this ridge and carrying the continent with them. On the Pacific zone side, the oceanic plate and the continental plate are doubling into each other or shifting along such breaks as the San Andreas fault.

N: Does it seem to be supported too by the migration theory of the tribes coming across to Alaska from the Asian mainland?

McL: Perhaps. But that would be almost a few minutes ago in geological time! [Laughter] And the existence of a land connection there may have been

McL: a result of the lower level of the ocean in the glacial periods. The time-scales of anthropologists and historians do deal with very much shorter periods than geologists need.

Rocks with the same types of fossils have been matched in South Africa and then in the southern end of South America. So that it would rather look as if those deposits had been formed in a terrain that was once united. All those things just looked like funny coincidences until this new evidence has come which supports this very exciting theory. I think it has immense bearing on the origin of belts of folded rocks and their distribution and on the uplift of present mountain ranges, and things of that sort. And we're right on a good, active place in California.

N: Trust you to live on a major fault line. [Laughter]

McL: I hope I'll still be here for the next big event. [Laughter]

N: I do indeed! I intend to phone you and find out what you're doing.

McL: If the phones are working! But, if my present schedule continues I'll probably be away and miss it. [Laughter]

N: Apparently this sort of frame house seems to do rather well in earthquakes.

McL: Oh, I think so. Except that we have a bad chimney on one side. I've warned everybody to keep away from that chimney. I would never have built a chimney like that here.

N: There are other kinds of chimneys?

McL: Oh, yes. We didn't build the house. I like the chimney, but you don't want to live under a heavy chimney that may fall. I don't see why they continued to build such big chimneys after the 1906 earthquake.

N: It's curious, isn't it? There are still these facades and parapets--unanchored parapets.

McL: I know. You can still find some awfully bad designs. A little bit worrisome.

N: This is such a fascinating topic, I don't want to get you off it.

McL: Rather far from Cerro de Pasco? [Laughter]

N: You know, it all does, certainly, link very closely together.

A Side Glance at the Greek Theatre

McL: You probably shouldn't record what I said about the Greek Theatre!

N: Oh, yes. That's too good to miss. Just to be completely wicked, let's talk about what happens to reinforcing steel in masonry.

McL: I was just wondering about the dangerous possibility that over a period of time--again I'm speaking as a geologist--the iron steel in the reinforcing will be corroded enough to lose strength. That has happened in some old buildings, probably with lower quality steel than they use today. I think I was told by one of the contractors that the reinforcing in the Greek Theatre, in the cornices over the stage, was in awfully bad shape, when the Greek Theatre was remodeled, some ten years ago. Which raises a lot of entertaining possibilities! [Laughter]

N: Yes, it certainly does! Now, these reinforcing rods, or beams, or whatever they are, are not exposed, are they?

McL: No. You've seen these buildings going up of reinforced concrete where there'll be a bundle of rods, and then the concrete is poured around those rods, so the steel is very well protected from the weather.

N: But it can corrode regardless of that?

McL: Well, you can imagine some cracks which shouldn't develop, but might, through the concrete, and let in a little seepage of water and air--moisture. You could get corrosion. Of course if you use nickel steels, and things like that that are very, very resistant, why that would be another story, but they are too expensive. Ordinary steel is not as resistant as nickel steel, or the chromium alloys. These alloy steels, which are very expensive, are very much more resistant.

A structure like the Golden Gate Bridge or the Bay Bridge has to be protected steadily with paints to protect the steel or the steel would corrode and the structure would be very seriously weakened. Steel inside reinforced concrete is protected, too, but it's not easily inspected.

N: No. Of course not. How would you do it?

McL: So you might have a condition where in some type of concrete or inferior material there was a leakage of moisture and air and a corrosion.

N: Well, that's the most chilling thought since a poem that purported to describe the first termite with a little bit of steel in its jaws! [Laughter]

McL: A termite that would eat steel would wreck us. Fortunately I don't think we have any of those.

N: No mutants quite that far yet.

X RETURN TO HARVARD: A PROFESSOR

N: Shall we get you back to being the youngest full professor at Harvard?

McL: That didn't last very long, because I'm sure that very soon somebody younger than I was appointed, and I got older. [Laughter]

M: Were you a Professor of Geology?

McL: No, I was Professor of Mining Engineering for a few years, and then it became apparent, I think, that Mining Engineering wasn't likely to survive at Harvard, so I became Professor of Mining Geology, which, after all, was my field. Instead of being a member of the Engineering School, I became a member of the Geological Department, in the Faculty of Arts and Sciences. I'm afraid we planned it that way in the beginning anyhow. [Laughter] So then I became for quite a while Chairman of the Department of Geology and Geography at Harvard. I was there for about sixteen years.

Marriage and Family

N: You left Peru and you went then to Cambridge?

McL: To Cambridge. I was married that year to a girl who lived in Kenilworth, Illinois, that's just outside of Chicago. Eleanor Eckhard. Her family were rather prominent Chicagoans. She had visited Peru earlier that year with a Vassar classmate, Elizabeth Drew, the daughter of Charles Drew, who was Vice President of the Cerro de Pasco Company. We met there.

N: Were they mining people?

McL: No. The family fortune came from milling. Her father was a lawyer

McL: in a well-known firm in Chicago--West and Eckhard. So I was married the same year I went to Harvard (1925). I was sixteen years at Harvard, and thought I was settled for life, but it didn't work out that way. We built a house on Cambridge Hill in Cambridge--a close-in area that was somewhat isolated by the river, the Shady Hill School and Mt. Auburn Cemetery--all quiet neighbors. Bob Bradford, who became governor of Massachusetts, lived next door. He and his charming wife, Rebecca, and their children, were all warm friends.

N: Did you have children from this marriage?

McL: Yes. Two children, Donald McLaughlin, Jr., and Charles. They grew up in Cambridge. Of course Charlie, then, wouldn't go to Harvard, because he'd grown up there, and I was pulling for Princeton, so he went to Yale. I thought that made him the black sheep of the family--or maybe the blue sheep--but he ended up right by taking his Ph.D. at Harvard.

And my older boy, Don, enlisted early in the war years. He was at Exeter, and enlisted in the Navy at seventeen. His eyes were not too good and he didn't get a commission, so he went through the war in the Pacific as a seaman and came out a very tough-minded individual. He wouldn't go back East. I was again living in Berkeley, but had left the faculty, so he was willing to become a student. So he came back and started in Civil Engineering here but shifted to Geology and took a Master's Degree in that field under the late Professor Taliaferro.

N: Is your son, Charles, also a geologist?

McL: He's in history. He has a professorship at the American University in Washington now.

N: Was it hard for you to get accustomed to campus life after the Andes?

McL: It was, a little bit, but it was like coming back because of course I'd been at Harvard three years when I was a graduate student and had many warm friends there.

N: I suppose many faculty members were there still.

McL: Oh, yes, practically all of my old teachers. It wasn't such a long time, from '17 to '25--eight years.

Don Jr. in his graduate student days at Berkeley married Harriet Warne, the young daughter of my close friends, the Clyde Warnes, whom I had known since they went to Cerro de Pasco in 1920 as a bride and groom. Don, too, spent some years in the Andes--longer than the time

McL: I was there. He worked mostly in Ecuador and Bolivia as a geologist on the staff of the Standard Oil Company of California. He later was in Colombia for four years or more on studies supported by the United States Geological Survey. With this background he has become very knowledgeable indeed on Andean geology, and an enthusiast about the field. They and their four children are now living very pleasantly at East Harwich on Cape Cod, which provides him with a base he enjoys.

Charlie also married while in the Graduate School. His wife, Ann Landis, is a Shady Hill and Radcliffe product and the daughter of James Landis, who among his many high and varied assignments was Dean of the Harvard Law School while I was still in Cambridge. Charlie and Ann were both stricken by polio in 1955 which left them seriously handicapped physically but not in spirit for their lives have been full and their achievements most satisfying. Charlie, after a few years at Stanford, where he was an instructor in the Western Civilization course, joined the faculty at American University in Washington where he is now a professor in the Department of History. He has been engaged for some years in editing the voluminous letters of Frederick Law Olmsted but seems to have time for a good number of other entertaining activities.

Summers at Homestake or San Luis

McL: My Cerro de Pasco friends wanted me to come back to Peru as a consultant for the summer--the summer of 1926--but at that time Edward Clark, who was then President of the Homestake Mining Company and a vice president of Cerro de Pasco wanted me to make a geological study of the Homestake. As he said, he thought the Homestake was through, finished. They'd had come discouraging results and thought the ore bodies were pinching out with depth. They hadn't gone to the right places. They thought the ore bodies were ending. Well, Homestake's still going on.

N: I loved the way you said, "They hadn't gone to the right places." That's the whole trick, isn't it?

McL: It certainly is. [Laughter]

N: How do you know the right places?

McL: No one does offhand. It takes a lot of very careful, detailed work really to get the right places. So I went out early in June 1926 to Lead, South Dakota. I spent the summer at the Homestake and

McL: organized the geological work there on a new basis, and eventually built up a very good staff for Homestake.

N: Was this your first exposure to Homestake?

McL: I'd been out there when I was a sophomore or junior in Berkeley, just for a summer, and I'd been there again on another short visit a bit later. But I'd had nothing to do with the operations, I was just a student. This was my first engagement by Homestake in 1926.

And so I didn't go back to Peru. That turned me to Homestake, so all the summers after that were devoted to Homestake or to the San Luis mine at Tayoltita in the state of Durango, Mexico, a mine in which the Hearsts had a big interest. They had no interest in Homestake at all in '26. All the Hearst stock in the Homestake Mining Company was sold after Phoebe Hearst's death. In some ways it seems rather surprising that I should go back to Homestake and eventually have charge of the company many years after the Hearst family was out of it entirely.

N: You seem to link up a lot of things in your own life.

McL: It does seem rather strange how things work out.

N: What sort of mine is the San Luis?

McL: San Luis is a high-grade silver/gold mine in the baranca country northeast from Mazatlan. In the early days you had to go in by trail, about a five-day trip. When I went down first, we went in from a station on the Southern Pacific railroad, called Estacion Dimas. Then it was a two-day trip by mule or horse back from the end of a rough road. The trail followed the Pioztla River up a terrific canyon back in the mountains. It was a hard trip. Now there's a landing field in the canyon, which is about as deep as the Grand Canyon. You land down there on a single inclined runway almost at the mill and the little town. It is rather a thrilling flight, and a more confined place to land than the floor of Yosemite would be.

So those two consulting connections kept me very busy in the summertime. Harvard is pretty tolerant about consulting work. A very interesting firm in New York--Case Pomeroy and Company--also wanted me to act as their consulting geologist, so I was down in New York frequently on work for them, as well.

I remember Jim Conant said he thought that these more or less widely-scattered activities made me a much better teacher, which I think was true. At that, I don't think I ever missed a class in

McL: the years I was at Harvard--or else I arranged to have someone better than I was to pinch hit for me, when I could reciprocate by taking over some of his work at a proper time.

I didn't really publish very much--a few papers occasionally. I'm sure the Berkeley faculty would never have promoted me. [Laughter] But I did have a full professorship and I didn't have to worry about it. And it didn't bother any of my colleagues or deans.

Harvard Colleagues

N: When you went on your consulting tasks, especially during the summer, did you bring along some of your more promising students?

McL: Yes. Generally, I'd get some of them jobs and indeed many of them did theses on some of the districts where they worked. In fact the former President of Homestake (he's now become Chairman of the Board, succeeding me) is John Gustafson, who was a student of mine at Harvard, who based his doctoral thesis on certain aspects of the geology of the Homestake deposit. The chief geologist at Homestake for many years was also a Harvard graduate, Jim Noble. And Paul Henshaw, who is now President of Homestake, was one of my tutees at Harvard. You learn who these bright boys are, get them jobs, and the first thing you know you're working together!

In fact, a lot of Harvard boys went down to Cerro de Pasco. We used to have what we called the "Cerro de Pasco Alumni Association"!

N: While we were thinking of your Harvard days, some of your books caught my eye. I see Graton and Sales, Ore Deposits in the United States. Is Graton your old friend?

McL: Yes. And Graton died last year, at the age of ninety and I've been asked to write a memorial for him. I've just about finished it. It was really rather a hard job. I knew him so well and he was such a complicated and wonderful person. But you can't say everything about a person in a memorial.

N: That's true. Probably the more you know and like someone the harder it is.

McL: Yes, it certainly is. The American Institute of Mining and Metallurgical Engineers put out these two volumes, The Ore Deposits in the United States dedicated to Professor Graton and to Reno Sales who was the chief geologist of the Anaconda Copper Company for a great many

McL: years. And one of his principal assistants--really his scientific colleague if not his guide--was Charles Meyer who is now Professor Meyer in geology here in Berkeley. He was also one of my students years ago at Harvard.

N: Yes, as a matter of fact he was the first man who told me what a marvelous lecturer you were.

McL: Oh really?

N: Yes. [Laughter] He thought that you were not only the best lecturer but the best teacher that he ever had.

McL: Well, I'm surprised to hear that because I never thought I was. If I'd been that good I never would have left the University.

My association with Graton started when I went on to Harvard as a graduate student, and then, the first two summers (1915 and 1916) I had jobs with him in the study of copper ores called the Secondary Enrichment Investigation, that he had organized and was carrying on with financial support from most of the major copper producers. It took me up to Alaska and all around the west. But I've already told you about that.

It was in my rooms, as I remember after a football game, that he met Edward Clark, then an officer at the Cerro de Pasco Copper Corporation, which led to his subsequent and almost life-long association with that company. I think we had tea in those days. We weren't drinkers; maybe we had punch, too.

His son, Eddy Clark, was then an undergraduate at Yale. Eddy had brought his mother and father up there for the football game in November of 1915. All were old friends of mine. I think we were--or at least some of us were--celebrating rather a notable Harvard victory--41 to 0--or something like that. Even graduate students were enthusiastic.

N: These were the Clarks who came to visit you?

McL: Yes, and the Gratons met the Clarks there. They talked a lot about geology and so on and the indirect result was that Mr. Clark was persuaded they needed some geological guidance at the mines in Peru. Another well-known geologist, John M. Boutwell, was also at my party and he was engaged as a consulting geologist for the Cerro de Pasco Copper Corporation shortly after that.

Later, when I got out of the Army, I joined him in Peru. He completed his engagement soon after that and Graton then came down as a

McL: consultant to start his long service with the company which brought us back together again, this time in the Andes. While I was down there, which was about five years, Graton made a number of short visits, generally during vacation periods at Harvard. So we worked together very closely at that time. I think that's probably the reason why when there was a vacancy at Harvard, Graton was the person who really urged that I should be offered a full professorship, which brought me back from Peru.

N: Oh yes, you were a very young professor, as I remember. What was it, thirty-four?

McL: Yes, I was thirty-four.

N: Thinking about Professor Graton who apparently was very influential in your life, and in the field, what was unique about his contribution? What was he particularly interested in?

McL: He was deeply devoted to the science of geology as it was related to the formation of metallic ores. He had very special and deep interest in the processes by which metal-bearing veins were formed and how the fluids that deposited the metals were derived from magmas, the molten masses in the earth from which such rocks as granite and lavas crystallized. He saw most ore deposits as an aftermath of processes related to the intrusion of molten material and he wrote rather voluminously and very fully on the subject.

He was indefatigable in searching for evidence. He travelled all over the world. He was a great observer. He was not a systematic mapper, however. He really didn't do the sort of work that most mine geologists do. But he was excellent as a consultant for them. He let the geologists at the mines do the detailed mapping, but he was very keen and so was his sense of what ought to be mapped.

He was an interesting mixture of a person who was a great observer in the field, in his own special way, and a deep student of related evidence contributed by physicists and chemists, even though it went sometimes a good deal beyond his own range of competence in those subjects. Then he certainly spent a lot of time quietly thinking about the meaning of the interrelated data and usually came up with stimulating and exciting ideas.

N: He was an "idea" man?

McL: He was an "idea" man, very definitely. It's a good way to put it.

N: Were people of his particular talents rare in the field?

McL: Well, he was a unique person. Yes, I am sure they are rare. There was really no one who had his particular talents. He had a succession of devoted graduate students many of whom continued to have some association with him all through their professional or scientific careers. It's perfectly surprising the number of students who worked with him who've gone into high positions. Among them were two who became college presidents. The President of the Colorado School of Mines until recently was one of his students who took his Ph.D. with him.

N: What was his name?

McL: That was Vanderwilt, John Vanderwilt. And Joseph Connolly, who became President of the South Dakota School of Mines and Engineering; Charles Meyer, on the faculty here, is one of his students; Professor Tunell, who was at UCLA, then at Riverside (now he's living in Santa Barbara, retired) worked with Graton; George Kennedy, Professor of Geophysics at UCLA, another one; Joseph Murdoch who retired some years back at UCLA; also all full professors and David Griggs, who's down there now, all had close associations with Graton. And yet he also aroused great antagonisms at times.

Well, perhaps I shouldn't say this, but I was very anxious for him to have a degree from the University of California. But he was not recommended by the Berkeley faculty, although Meyer I know had urged it. Well, Tunell at Riverside successfully recommended him and he received an LL.D. degree at that campus, while Tunell was there.

N: Well, I'm glad he got it.

McL: Yes, and I don't know anybody in our field who deserved it more than Graton, as a most distinguished, productive scientist. But you see, he did stir up antagonisms.

N: Strong personalities tend to do this. They're not bland enough to be liked by everyone.

McL: He should have been a member of the National Academy of Science, but there were probably a good many influential members among the geologists in that august organization who were inclined to be sharply critical of some of his work.

N: This quality of being an "idea" man and a good teacher and attracting able students seems very valuable.

McL: It really is. In the mining world, Robert Koenig, now President of the Cerro de Pasco, was one of his students; and Horace Fraser, who died a couple of years ago, served as a Professor at Cal Tech for a few years and then became the President of the Falconbridge Mining

McL: Company, a large nickel/copper producer in Canada. Hugh McKinstry was another student who had started his professional career with Graton and me in Peru and later was appointed to my old professorship after I resigned in 1941. The list of his students who achieved recognition is really a long one. Robert Hoffman is another. He made a fortune for himself in mining ventures and recently provided funds for a new building for the Harvard geological department.

N: Did people come specifically to study with him?

McL: Yes, I think so. There was a period when Harvard had, I think, the outstanding department in mining geology. Graton was certainly the person who attracted as many, or perhaps more, graduate students to the department than anybody else. The department, however, was then a particularly strong one. For example, there was in mineralogy, Charles Palache, who also was a Berkeley Ph.D.--a truly great scientist and a wonderful teacher. He came from a Berkeley family that lived in the Claremont district in the early days. I think his sister is still living in Berkeley.

Then there was Esper Larson, another Berkeley Ph.D., who was a most distinguished member of the Harvard department. Larson was a very able, a very great petrographer and petrologist. Palache was a mineralogist. And then there was a Canadian, Reginald A. Daly who was a most dynamic and exciting teacher in many broad fields in geology. Igneous rocks were a major interest particularly during my student days, but his range was very wide. He was a pioneer in a lot of things.

Kirk Bryan in geomorphology was another notable member of the department. He was truly a worthy successor to William Morris Davis, who was a pioneer in the field then called physical geography. Indeed, I think Bryan was the more distinguished, and a good companion too. But I didn't know Davis except as a very old man with rather dogmatic opinions. It was quite a lively group and the records of the graduate students they attracted surely contributed to the high reputation at the old department.

N: You wonder whether they took people who were just good and made them excellent, or whether the exceptional students were attracted simply by the school's reputation.

McL: Probably a little of both. But Harvard was never an easy school to get into. The Graduate School of Arts and Sciences at Harvard was and still is decidedly selective--generally wisely. For the most part, they attracted good men, and I think they did well by them too.

Graton was particularly effective in the enthusiastic way he promoted geological studies by mining companies. He generally functioned as a consultant to those companies but his approach was always

McL: a very broad one, for he insisted on carrying on the work as if it were a basic scientific study. Most of the people he had under him were company employees who really organized and directed the work and carried it on quite independently, but Graton's advice and counsel was always extraordinarily stimulating. But Graton, alone, I don't think, would have been a very effective person in the day to day task of finding ore. His interests were too basic, you might say, to give first attention to the immediate needs and to the practical operations of exploring for ore and developing mines.

N: You were speaking earlier of his particular interest and his theories; were there other theories that were not in sympathy with his?

McL: Oh no. Few of Graton's theories were regarded as extreme or way out. He followed a great geologist whom he had worked with in his younger years, Waldermar Lindgren, who was the dean of American mining economic geologists before the war (World War I)--a famous authority on ore deposits for years and years. He was with the United States Geological Survey. Graton had worked under him when he was on the survey. Lindgren later became Professor of Geology at M.I.T. and I knew him there. He was a wonderful person and he was Graton's hero. He was, I should think, perhaps fifteen years older than Graton. Died quite awhile ago--in the late thirties, I think.

But Graton's general approach towards the sciences was really along the guidelines Lindgren had started. So I don't think there was anything very revolutionary in Graton's work; but he was an independent thinker and a most stimulating teacher and associate. He really used mines as laboratories, as places to study geology and draw broad generalizations as well as practical conclusions from what he could observe in them.

His longest connection, apart from Harvard, was with the Cerro de Pasco Copper Corporation and he eventually became a member of its Board of Directors. I was also on the Board, so our association was renewed again at a much later time during and following the short period when I was a Vice President and General Manager in Peru (1943-1945).

Then another organization we were both connected with--though not actually associated together--was the International Nickel Company, which is the largest producer of nickel in the world--and of copper in Canada. Graton, many years ago, became their consulting geologist and played a great part in organizing their very extensive geological department. They operate in many parts of the world, but their greatest mines are in the Sudbury district in Ontario.

Then about twenty years ago, just about the time Graton was retiring as their consulting geologist, I was appointed a director of the International Nickel Company and have even helped out a bit as their consulting geologist for the past few years. So there again, our paths converged though we overlapped only a short time.

XI GOLD: GEORGE HEARST AND THE HOMESTAKE MINE

N: Shall we talk about the Homestake Mine now? I would like to hear your thoughts about Senator George Hearst too.

McL: Yes. Of course in his mining days he wasn't a Senator. That was after he made his money. [Laughter] He started in the Nevada City region where he worked a small mine for a while. I don't believe it was particularly successful--it wasn't a great mine.

While he was there, however, he heard about the Comstock discovery in Nevada and was one of the first who went back over the Sierra to that district. He promptly recognized the immense value of the rich silver-gold ores there--even though the deposit was very different from the quartz veins of California--and he moved quickly to acquire a position.

His first really important success was the Ophir Mine in the Comstock, in which he made his first substantial fortune. After that, he became associated with J. B. Haggin and Lloyd Tevis in San Francisco. I don't know how formal an organization it was. It probably was just an informal sort of partnership where Hearst got a half interest in the properties for his efforts to acquire valuable claims and develop mines. They were the financial people who put up the money.

Hearst really covered the West in the days when that meant hardship and hard work. He went out to see things himself and he must have had an amazing sense of what it took to make a successful mine. Of course, there were marvelous ore deposits available to acquire then, but even so, few, if any, had the ability to spot the really great deposits that Hearst had.

His next big success after the Comstock was the Ontario Mine in the Park City district in Utah, which was a silver-lead mine. It is still running. It's not very far from Salt Lake--I think it's within fifty or sixty miles of Salt Lake.

McL: Then he sent an agent to the Black Hills shortly after gold had been discovered there in 1875. An option was obtained on one of the first claims that had been staked--called the Homestake--and it was purchased for the group.

Hearst himself went to the Black Hills very soon after that and spent more than a year up there. He recognized the magnitude of the deposit and that an extensive area had to be controlled if it was to be mined successfully. He bought a few key claims for himself and his associates and started the policy of acquiring ground that eventually made the Homestake Mining Company practically the one owner and operator in the district.

N: Right. Now was this still Indian territory? Was it Sioux country?

McL: Oh, yes. It was Dakota Territory as it was called then. The Black Hills were in the western part of Dakota Territory. The railhead was a couple of hundred miles away to the south at Sidney, Nebraska--the Union Pacific was the nearest railroad--and all the equipment and everything had to be hauled over the plains in oxcarts. Yet, in a surprisingly short time they built a big mill up there and started a mine that can now claim to be the largest gold producer in the western hemisphere.

Homestake: Low-Grade or High-Grade?

McL: He recognized than that this was not simply a vein mine, like the veins of the Mother Lode. He thought of it as a broad lode that would have to be mined in bulk and that the ore would probably be so low in grade that it could be profitable only if it could be handled on such a big scale that you could get very low costs.

So they started mining up there in an open pit, and then carried on underground mining on more or less the same basis, taking everything between what was thought to be the limits of a broad lode so that the Homestake gained the reputation of being a very great low-grade mine.

As a matter of fact, the ore is not low grade, but the individual ore bodies are so irregular in shape and distribution in highly folded rocks that they have to be carefully delineated if they are to be mined without being diluted with barren rock from their walls.

Hearst probably had the right idea at the beginning before they could distinguish how the gold was distributed. They just took every-

McL: thing, and made it successful by mining a big quantity at a low cost per ton. It gradually had to change to a mine in which we carefully outlined where the ore was and confined the mining to ore with avoidance of mining it with barren rock. This made it possible to achieve a lower cost per ounce of gold, though at a higher cost per ton of ore. And it is unit cost per ounce of gold that determines profit, rather than unit cost per ton of ore and rock that is broken.

N: This was something that you were in...

McL: That was my particular type of work later on in which we carefully outlined the ore bodies and confined the mining to them. So we gradually changed the mine from a low-grade mine to a relatively high-grade mine. It produced a good deal more gold annually and made much more money.

But it was a very successful operation from the start as Hearst had put it together and brought it into being under extraordinary difficulties in the early days. It took a lot of boldness and imagination. Hearst's great contribution up there was realizing that the deposit had to be worked on a big scale to be successful. The little individual claims by themselves were not worth too much and probably none of the owners would have made much money by attempting to work them separately.

Hearst recognized this and spent nearly two years there during which he started the policy of acquisition of claims that much later covered practically all of the ore-bearing ground. That really was an essential first step in making the Homestake the great property that it became. And after he had started the enterprise on its way, he left the district and as far as I know, he never went back. The operating management was left to men he selected.

N: Was he one of the first to operate in this way, or had this been done in other parts of the world?

McL: His record certainly hasn't been matched. The Homestake Mining Company was established by the partners to serve as the legal owner of the properties that had been purchased. It was incorporated under the laws of California on November 5, 1877 and soon after it was listed on the New York Stock Exchange. It is the oldest mining company in that august assemblage of American enterprises.

Hearst and Daley: Anaconda Copper Mines

N: So Hearst was an innovator?

McL: He was an innovator, yes. And then he did another thing a couple of years later. In 1881, he and Marcus Daley acquired a group of claims

McL: in Butte, Montana, out of which the Anaconda Mining Company eventually grew.

At first silver appeared to be the principal metal in the veins in that district. But the Anaconda Shaft which Hearst himself located encountered extremely rich copper sulphides ores when it was sunk below the superficial zone of oxidation. That was an entirely new field for him. He'd been in gold before and silver.

In those days, the recovery of copper even from such high-grade sulphide ores was beyond the ability of anyone in the West and the ore had to be shipped to Swansea, in Wales, for treatment. You can imagine it had to be awfully rich to stand that cost. He soon recognized that means to recover the copper had to be provided locally and this was accomplished even though little was known about the techniques at the start.

N: Are there different problems in getting copper out of the ore than in getting gold out?

McL: Metallurgically, yes. Very much. The gold, if it's the free gold in the rock, is quite easily recovered by amalgamation and cyanidation. The ore is crushed and run through mills, and part of the gold is quickly caught by mercury, from which the relatively pure gold can be easily recovered. Toward the end of the century the cyanide process was developed, by which a dilute solution of potassium, sodium or calcium cyanide is used to dissolve the gold in the crushed and finely ground ore.

At Homestake, we use amalgamation first and follow it up with treatment by cyanide. In most copper ores, the metal occurs as sulphides. Unless the ore is extremely rich to start with, it has to be crushed and the sulphides concentrated. Then the copper is recovered in an elaborate smelting process in which the metals are collected in an iron-copper sulphide melt (termed matte) which in turn is reduced to an impure metallic product known as blister copper in furnaces called converters in which the iron in the matte is removed in a slag and the sulphur is burned off.

This is a relatively complex process and was not too well understood in the days when the Anaconda mines were being developed. They really went to Butte, I think, more with the hope of developing silver ores than copper, but after fabulously rich copper ore was encountered in the Anaconda Shaft it was recognized that copper was the dominant metal in the district.

N: Was there much thought in the early days of mining about the effect on the countryside?

McL: Oh, in the early days, absolutely none. The people going into the West then were fighting the hardships of the frontier, and their whole idea was to exploit whatever they found without any thought whatever to the effects on the local landscape.

In some of those older operations in which the sulphide ores first had to be treated, they were just roasted in heaps in ways that spread fumes of sulphur dioxide all over the neighborhood. It killed the local timber and made a very unatractive desert-like country close to the plants. But that was gradually changed as techniques improved.

N: It's an interesting example of the problems of mining.

McL: Oh, definitely. The problem then was to try to make a profit and survive in these extremely remote places.

Water and Timber for Homestake

N: Was there a problem, for example in the Homestake Mine area, of finding sufficient water?

McL: There was sufficient water, but not abundant water, and there was great competition in getting an adequate water supply. As so often, in a gold district, the deposits were found by prospectors who washed gold from the stream gravels. Water is of course essential in that process. And much larger quantities of water were needed for the huge mills that Hearst was putting in. They had to have practically all the water that was available. So control of water became critical and there was a lot of litigation and difficulties over the acquisition of rights to the limited local supply.

N: So many things become involved.

McL: Oh, it was an intensely competitive time. The law governing water rights isn't the clearest thing in the world. There are some nice streams in the Black Hills, but the water where it was needed was very much in demand and the Homestake could not have been created without getting title to very important supplies of water.

N: Did the state hold title to the water rights?

McL: Those titles I suppose were based on federal laws. It was just a territory, you see, then.

N: It was still a territory, I see. Do mines require timbers, too?

McL: Yes, and the Homestake Mining Company acquired very large areas of timber lands. A lot of timber was used in the underground mining in those days, much more than we now need per ton. We don't use nearly as much. Most of the sand in the mill tailings goes back into the mine now to give support to the ground after the ore bodies have been taken out. The ground-up ore after the gold is removed mostly goes back into the mine.

The company built and ran a number of saw mills over the years and still operates one at Spearfish, some twenty miles northeast of Lead. The logs come both from the company's own timber lands and from Forest Service lands. In fact, the company has contract number one with the Forest Service.

A great area of the northern Black Hills in the early days was cut off just for firewood, burned under steam boilers for power. There was no other power source at that time to run the mills and hoists. Some early photographs show huge piles of cord wood. But in that country--it's one lucky thing--the forests reseed themselves and the portion of the hills around the mine that had been virtually stripped are now covered with a fine second growth of Ponderosa Pine.

So today, a large part of the northern hills is covered with a second growth forest that is about fifty or sixty years old, and they're pretty nice trees. Of course, even the original trees were not big trees up there--at least by California standards.

N: Is it a rather high elevation?

McL: About five thousand feet to seven thousand feet. Very pretty country. The company later developed a coal mine out on the plains some eighty miles to the west, where very thick beds of coal were found under shallow overburden. The coal is mined in open pits and used in a coal-fired power plant nearby. Two small hydro-electric plants were installed about sixty years ago. They are still in use, but provide only part of the power that is needed.

N: Did Mr. Hearst arrange to have the railhead extended up to the Homestake Mine?

McL: Probably companies like the Chicago and Northwestern and the Burlington that eventually reached the Hills didn't need much urging. The Homestake itself built a narrow gauge railroad of its own at a fairly early date to bring in timber after the local supplies had been exhausted. That was before Senator Hearst's death.

The Chicago and Northwestern later built a railroad into Rapid City and up to Deadwood and Lead to serve the mine. The Burlington

McL: also constructed a line into the Black Hills. I think that was before Hearst's death--he died in 1891. That's a long time ago, the year I was born; [Laughter] So I didn't know him, obviously, but he must have been quite a fascinating old boy.

N: Yes, he must have been. Unfortunately, the accounts are so sugary about him.

McL: Well, not all of them. But the story of his life in the vellum volumes up there on the shelf surely doesn't show what the real man was like. He must have been a much saltier character.

N: I'm happy to tell you that I found a typographical error in one of the vellum volumes. [Laughter]

McL: The best records we have are some letters Hearst wrote when he was in the Black Hills to tell his associates what was going on. Shortly before his death he started to write a biography, probably dictated it. Bill Hearst, his grandson, has published some parts of it that are really fascinating.

Most of the Homestake records about the early organization, correspondence, and so on, were burned in the 1906 fire that destroyed the Hearst building in San Francisco and the Homestake records that were there.

Some of Hearst's letters that we have probably were in files at the mine in the Black Hills. They turned up in our office later after I came with the company. They are obviously written by a secretary and signed by George Hearst. Most of them are letters to Haggin and to Tevis who were in San Francisco in the early days when the property was being put together. They tell about the rough times that were going on and the danger--the murders that occurred. In one of them he wrote: "If I get killed, don't bury me up here. See that I'm brought back."

N: The Wild West went back pretty far East in those days, didn't it?

McL: Yes, well, that's about the middle of the continent! [Laughter]

N: Maybe if the Homestake Company is so inclined, some photostats of those letters might go to The Bancroft.

McL: Yes, I think they should be in The Bancroft. Bill Hearst has given all of his grandmother's--Phoebe's--letters to The Bancroft Library. And I think these letters from the Black Hills ought to go to The Bancroft, too. I'll look them up. I think the originals are up at Lead now.

N: There are so many interesting aspects to the Homestake Mine.

McL: Did you get a chance to look over the book a little bit, Mrs. Fielder's book?*

N: Yes, I did. And it gave me several ideas that I would like to pursue with you:

One, some of the external events that transpired during the time that you had responsibilities at Homestake, including the Depression, the stock market decline, the war, and so on. And then possibly some of the problems of fire, water, unionizing, fallen rock, and the problems that arose during production.

To begin with, was it 1925 when you came into the Homestake Mine?

McL: It was 1926, the first summer I was up there as a consultant. They had, at that time, a very erroneously pessimistic view about the future of the mine. The relationship of the ore bodies to the complex folds in the ancient sedimentary rocks hadn't been too well deciphered. Certain individual bodies seemed to have played out. They didn't realize there were others to be found in adjacent structures.

N: Were Lawrence Wright and Arthur Yates active then?

McL: Lawrence Wright was the geologist up there when I went up at that time. He had a very pessimistic view. He was rather a limited person in his geological background. He really was not much of a geologist.

N: And you were still on the faculty at Harvard, weren't you?

McL: Yes. That first summer, my old friends in Peru--the manager--wanted me to come back to Peru for the summer to make a particular study of a mine that they thought they might be able to acquire.

It would have been very interesting to have gone back, and I wanted to. I think they would have acquired the mine if I had gone back; they didn't do it and it was a mistake. It was the Cia des Mines de Huaron. But Mr. Edward Clark, who was the president of Homestake, and also vice-president of Cerro de Pasco at the time said that he wanted me to make a study of the Homestake. He had been told that the

---

*Mildred Fielder, The Treasure of Homestake Gold (South Dakota: North Plains Press, 1970).

McL: Homestake was through--it was approaching its end--but Clark thought they'd better have somebody take a look at it, and really see if that was the situation.

So I left Cerro de Pasco and went to Homestake, and I've been associated with Homestake in one way or another ever since.

Reassessing Homestake

McL: I felt from the first out there that they were just improperly pessimistic about the future of the mine. You can see from that book how George Hearst really created that company by realizing that he had to acquire everything that he could get hold of. He put the original block of claims together--not of course in the two years or so he was in the Black Hills but during the next decade when he was dominant in the company's affairs. If a lot of individual companies had started to mine that great ore body as separate operations none of them would ever have amounted to very much.

George Hearst had the concept of putting it all together, to mine it on a big scale, that made it one of the country's truly great mines. He created the company and the enterprise, and he deserves the first credit. The man who staked the original Homestake claim that gave his name to the mine, to the company, was just one of a half-dozen who had staked claims all over the hill where the ore bodies outcrop. That one claim was not the Homestake Mine, but it was the first one Hearst bought, and he paid a very decent price for that one claim ($70,000).

In his two years up there he really started the company on its course. Their first concept was to mine on a big scale, and get low costs and so on. I know the impression grew that the Homestake was a great low-grade mine. It was profitable even when mined that way, but it became much more so when the ore was mined more selectively. That made it a relatively high-grade mine, and greatly increased profits. But for years they failed to recognize just how the gold was distributed in the folded rocks. They simply mined everything that came, so the ore that went to the mill was so diluted that the average grade in gold was very low. Even so, the operation was profitable, but they were turning out a small fraction of the gold that the mills could have produced if mining had been strictly confined to where the gold was.

N: Would their technology at that time have permitted this sort of selective mining?

McL: Probably not. That is, the geology was quite obscure. It took a lot of very careful mapping and study by a succession of geologists to know just how gold occurs and how the ore bodies are distributed. They are in ancient sedimentary rocks that are very tightly folded and, to use the geological term, metamorphosed. They are old sediments metamorphosed into slates and phyllites and schists and rocks of that sort, so that you don't easily see the structure of the original folded layers. Yet it was the structure of these original folded beds, particularly the one bed that contains practically all the gold, that gave the key to the distribution of gold in this big zone.

A geologist at the United States Geological Survey, Sidney Page, published the first bulletin on the ore bodies, in which he emphasized the sedimentary structure of the rocks and the confinement of the ore to one layer. He didn't have the opportunity to map with the detail that was necessary to apply it most usefully in the actual mining, but he deserves great credit for recognizing that the ore bodies were in one folded bed that could be distinguished and mapped.

The bed can be traced for many miles, far beyond the limits of the mine. Practically all the ore is in that bed, though the portion of the formation that contains ore is far less extensive than the layer of rock itself. As you can well imagine, the distribution of that productive bed has been most carefully mapped not only in the mine itself and on the adjacent surface, but for miles through the hills.

There were two men on the staff, J. O. Hosted and L. B. Wright, who worked with Sidney Page, but neither one of them really had the geological background to carry on very well. When I went up there I got hold of Arthur Yates, who was a graduate of Berkeley, and the son of the Superintendent. I couldn't really get any place with Wright. He just didn't know enough.

Yates became enthusiastic about the problem and he went on for two years, carrying out a program of careful mapping that I wanted done, which provided the guidance necessary for the more careful and selective mining that made it possible to raise the grade of the ore that was sent to the mills. It was changed from about $4 of gold per ton to $8 (at the old price of $20.67 per ounce), which made a terrific difference in output and profits.

Then along came Roosevelt, who increased the price of gold from $20 to $35 and it all coincided. So Homestake in that particular period had benefits from increasing the grade through more selective mining and from having Roosevelt increase the price of gold. And Roosevelt got all the credit! [Laughter] Well, not all. I think we got plenty of credit out of it.

N: So the Presidents have not always done you dirt, then.

McL: No. In spite of the fact that I don't admire him, Roosevelt really helped us. He did the right thing, at the time, in increasing the price of gold, but for the wrong reasons.

Management Aspects of Homestake

N: I haven't yet asked you much about the managerial aspects of the Homestake enterprise.

McL: Well, yes, I'll be glad to talk a little bit more about Homestake. Homestake is a publicly owned company, and indeed, it's the oldest mining company on the New York Stock Exchange--I think that 1879 was the date of its first annual report to stock holders. In its early years, really for more than almost forty years, the management was closely related to the group that had organized and established the company, that is, the Haggins and the Hearsts. The Tevises in the original group, sold out rather early, because they disappeared from the board and from the affairs of the company. Louis Haggin, the son of James Ben Ali Haggin (who was Hearst's associate), represented the Haggin family and became president of Homestake in 1883 for about ten years.

But really the dominant person even in those years was Edward H. Clark, who became the manager of the Phoebe Hearst estate after Senator Hearst's death. Clark became a director of the Homestake Company in 1894. At Ben Ali Haggin's death, Clark succeeded him as president in 1914.

George Hearst left practically all his stock in Homestake to his widow, so she had a very large percentage of the Homestake stock, and Edward Clark as her representative was on the board for a long, long period. He then served as president of the company for around thirty years. He was a director for fifty-one years. He died in 1944, shortly after I became president. I served as president until December 31, 1961, and then became chairman of the board. In 1970 I was elected chairman of the executive committee and honorary chairman of the board, positions that I still hold.

N: I see. Was the company public from the very beginning?

McL: It was, yes, because shortly after the company was organized it was put on the market and a certain amount of stock was sold. The original prospectus is very interesting, stating that they have so much

McL: ore blocked out and they were planning to build mills, and so on. It was a successful venture from the start and the new stockholders who bought in certainly had a bargain.

N: The controlling interest that came to Mrs. Hearst was not necessarily 51%, was it?

McL: No, I'm sure it wasn't 51%. No, it was probably well diluted below that, but nevertheless with a great number of small stockholders it practically was the controlling interest; and the combination of the Hearsts and the Haggins really made a bloc that had control of the company very definitely. The company in those days, before the present regulations about stockholders' rights and so on, was really almost managed as a family company.

N: And Mr. Clark was the dominant figure?

McL: He was the dominant figure after J. B. Haggin and Louis Haggin had died. Most of the other directors in the company at that time were really little more than employees, you might say. Oh, there were a few, yes, but for the most part it was run as a family company--and the information given to the public, or even the stockholders, for that matter, was minimal. In the old annual reports, Mr. Clark's report, as president, was usually no more than two lines: "I herewith transmit the statements of the general manager....and the financial figures....Yours respectfully,"

Those were the days when you didn't have to discuss your company affairs publicly. I think Mr. Haggin was asked before some congressional committee in the early days what his business was, and he said, "Minding my business is my business." And he got away with it then. [Laughter] But times have changed.

Then after Phoebe Hearst's death, in 1919, in the settlement of the estate, practically all of her holdings were sold by the estate. I don't believe William Randolph Hearst, who was the principal heir, was interested in holding Homestake, so their stock in Homestake was reduced in a few years to practically zero. Edward Clark continued as a vice president and eventually became president of Homestake. He had some personal holdings in Homestake, personal stock, but the great block of Hearst stock he had originally controlled was gone at that time.

The Haggins' stock has been divided into the many, many branches of that family, so that it hardly constitutes a solid block of family stock any longer. There is still some stock held by the scattered Haggin heirs, but it's less than 1% of the company, I'm sure.

McL: There's an interesting California story about the Haggins that The Bancroft Library ought to look into some time. I don't know it well enough to be the source for that information, but an extraordinary story could be written about old James Ben Ali Haggin, who was the partner of George Hearst. He lived until a very old age, and his widow, a young woman he married in his late years, just died the other day.

Then there's another family, the Fermor-Hesketh, who were related by marriage to the Haggins and the Sharons and the Tevises. They retained a substantial block of Homestake stock and also a very much more substantial block of Kern County land, from the days when it was just a land company, which I think contributed immensely to their fortunes. John Fermor-Hesketh, a younger brother of Lord Hesketh, was on our board for quite a few years. He's been dead, oh, about seven or eight years, I think, now, and their holdings in Homestake have also been reduced. I don't think they have more than a very nominal amount of stock now.

N: Originally, then, is it right to assume that most of the larger stockholders were Westerners or Californians rather than people from the Homestake area?

McL: The original money came entirely from the three associates in San Francisco and they remained the dominant stockholders for over forty years. The rest of the money was raised from the sale of part of the original stock when it was listed on the New York Stock Exchange. It would be an interesting bit of research (if the records are available) to see where that stock was held and who participated in the original flotation of the stock.

N: I have just looked through the Homestake book that you gave me, and I don't remember too much about that, but there may be a little.

McL: I don't think there is any comment on it, and I'm sure the information isn't available in Lead. In fact, I don't know just how you'd get at it. Our old Homestake records were burned in 1906, you see, in San Francisco, and whether or not records of that sort were preserved in the New York offices of the Haggin-Hearst group, I don't know. Probably were--it might be possible to dig them out, but it would be quite an excavation job. There is a substantial amount of stock held in South Dakota and some of it probably was acquired a good many years ago.

Lady Hesketh--Kistie--the widow of Lord Hesketh--and the late John Fermor-Hesketh's sister-in-law, though not an admirer of his--is here in San Francisco right now. She's a very charming person, a Scotch girl who still lives at Easton Neston in Hampshire. Sylvia and I spent some time there a few years ago. It's one of the great estates of England, and I think a national monument.

N: Could we go back to your tenure at Homestake? Did your tenure overlap that of the first Edward Clark?

McL: Yes. Edward Clark had known me since I was a little boy, a little child, and his son, Edward Clark, Jr. and Helen Clark, who died several years ago, were very close friends of mine. So I knew Mr. Clark very well, and was very fond of him. He was very fatherly toward me, and when I came back from Peru in 1925 he wanted me to go out to Homestake that summer to make a study of the mine. He said he thought Homestake was through. He had had a lot of pessimistic reports.

So I started my official geologic work for Homestake in 1926, that summer, and then I remained as consulting geologist right along until I became president of the company in 1944, and Edward Clark became Chairman of the Board shortly before his death.

N: What sorts of responsibilities did you have as consulting geologist?

McL: At first it was primarily to make a report on the geology directly to Mr. Clark and to make recommendations to him, to advise him about the future of the mine, the prospects for finding more ore, and what should be done to develop more ore.

Then gradually, when those recommendations and studies were followed, I had a good deal to do with the selection of personnel also. A consultant has to work not directly by giving orders but by winning a certain amount of respect from management, and I think I got along pretty well out at Homestake.

Bruce Yates was General Manager then, and we had very friendly relations. But gradually during that period while I was at Harvard, Mr. Clark really came to rely on me a good deal. I went down to New York once a week and spent quite a little time with him discussing Homestake affairs. He was not a technical man, and I think he handled things very well by having technical people around him in whom he had confidence. When he gave you his confidence he backed you up, so I really had a good deal to do with many Homestake decisions even before I became a director in 1941 and president in 1944.

N: From your description I take it then that it was really Mr. Clark who made most of the decisions and the board was not too earnestly concerned?

McL: Yes. That was really the case. He was really making the decisions but ran the company by relying very much on the manager, who was then called the superintendent, and a few other associates. There were also a few people in Lead for whom he had great respect, such as Chambers Kellar, who was the attorney for the company.

N: I gather from your description of him that you think that Mr. Clark was able, that he was a competent man.

McL: Oh, yes. He was a very good business man. He had good judgment in business, and while he was very conservative in most mining ventures, his judgments were sound. He was not an aggressive person in that he didn't use the company as a vehicle for expansion into one of the really great companies, such as, let's say, American Smelting and Refining or Anaconda or Newmont that expanded into worldwide enterprises.

Connection Between Homestake and Cerro de Pasco

McL: Edward Clark was also closely associated with Cerro de Pasco. After Louis Haggin died, Clark was elected president of Cerro de Pasco. So for a time he held both presidencies--Homestake and Cerro de Pasco--at the same time. But then he managed Cerro de Pasco very much as he did Homestake, except that he had a much more independent board of directors.

The board of directors at Cerro de Pasco gradually acquired really a great deal more power than they had originally. But Cerro was set up, started, as a syndicate, and then the company grew in various ways and became a big public company. Also, different new groups bought into Cerro and exerted their influence very decidedly in the company.

N: So these two mining ventures are examples of different kinds of structure?

McL: Yes, in a way. There is a certain relationship between them in that the Haggins and the Hearsts were in the original syndicate that acquired the original Cerro de Pasco properties from an American named McCune, who really first assembled the group of mining properties in the Cerro de Pasco district and persuaded Haggin and Clark and the others to organize a syndicate and develop the properties.

That started Cerro de Pasco, but much later, of course; that was the early twentieth century. Then as Cerro grew it grew into a larger company than Homestake. It never was a company as closely controlled by a small group as Homestake.

N: Let's speculate just a moment, if this would interest you. If another personality than Edward Clark had been directing Homestake, do you think it would have developed in a different fashion?

McL: Probably. An aggressive person, let's say a person like Fred Searls,

McL: a graduate of the mining college here in Berkeley, for example, who built the Newmont into a worldwide company might have done the same thing with Homestake. Clark did not have that point of view. In fact, he was inclined to regard himself as a conserver of wealth rather than an expander of wealth.

N: A very interesting difference.

McL: Yes. But it is only fair to point out that the Cerro was a very successful venture that Phoebe Hearst's estate went into under Clark's direction, although J. B. Haggin was probably the dominant personality involved in organizing the syndicate and acquiring the mines.

Under a couple of energetic general managers the original Cerro de Pasco company expanded most successfully in Peru, and it became for many years the largest mining operation in the country.

N: Just from your own preferences, if you were placed in such a position what would you rather do? Would you rather be a conserver or an expander?

McL: Oh, I think it's much more exciting expanding a company and undertaking exploration--both exploration to find new deposits and also acquisition of smaller companies that are already going but haven't developed their full potentialities.

As I look back at the Homestake as it was managed some forty years ago, interest in expansion on a significant scale just didn't exist. For a time it was felt that nothing less than another Homestake had to be found, but the exploration work that was undertaken was really quite nominal in relation to the magnitude of such a problem. They were thinking in terms of a few hundreds of thousands of dollars rather than thinking in millions, and it takes millions to find and develop new mines.

N: If Homestake had been expanded more aggressively, would it always have been with respect to other gold mines?

McL: At first, under Mr. Clark, what little exploration they did was almost entirely directed towards getting hold of other gold mines, but I don't think they would have turned down an opportunity to have gone into something else that was very big. But Mr. Clark shied away from some of those big things. When he was a director of the American Metal Company, he was one of those who was opposed to that company acquiring the great Climax molybdenum deposit, which became a major company and is now united with the American Metal Company as the American Metal Climax.

McL: Clark's opposition to that as a matter of fact was used as a defense by the chairman of the American Metal Company who was sued by stockholders for having turned down the acquisition of the Climax molybdenum, though he eventually went into it himself.

He demonstrated that his board turned him down, which was quite correct. And Mr. Clark felt that was the right decision at that time; he felt that a metal like molybdenum was a very doubtful thing to get into. A very cautious point of view that proved to be most unwise. But, with hindsight, it is easy to criticize.

N: Yes. So then eventually of course, you came into a position of directorship in the Homestake.

McL: Yes. I wasn't the director of Homestake until '41, after I came out to California. The meetings were always in San Francisco, and when I came to Berkeley, it was very convenient to have me as the director. They always wanted a group of directors right here in or close to the San Francisco office.

N: Was the main Homestake mine office always in San Francisco?

McL: Yes. Well, it was in a rather absurdly small office. The Homestake Mining Company and the Kern County Land Company and the San Luis Company--that was the Hearst-Haggin company in Mexico, in Durango--were housed in a little group of offices that occupied at the beginning less than a third of the ninth floor of the Bank of America Building. Then they expanded and took about half that floor, more or less.

At that time--when oil was discovered--the Kern County was emerging from being a tight little family-controlled affair to a great big company. When I became a director of Homestake, we shared offices with both the Kern County Land Company and the San Luis Mining Company--a very economical arrangement.

N: Were you personally involved with the Kern County Land Company?

McL: No. I knew many of them very well as close friends, but I had nothing whatever to do with them at any time, unfortunately.

N: You had quite a few things going at the time. Then as you were saying, when you came out in 1941 the you became a director and then president in 1944?

Edward Clark's Tenure and the Building of a Board

McL: Mr. Clark's health had been very bad for really quite a long time, and he would have been well advised to have retired a good many years earlier. In the Cerro de Pasco organization, certain directors insisted that he should retire, which he did.

N: It's hard to give up power.

McL: It's awfully hard to give up power, and he'd had so much of it in his own hands, but he had to accept what they decided in Cerro. Homestake was a different thing. With a very warm group of friends around him, everything worked out all right. He became chairman of the board when I was elected president of the company and chief executive officer, but we didn't define it very carefully that way.

It was easy and pleasant to work with Mr. Clark. He could be a very tough-minded person at times but essentially very much of a gentleman--a great gentleman and very loyal to his associates when he'd given his trust and his confidence. So there was no problem in working that way.

When he died, he was still chairman of the board of Homestake, After that for some years, we got along comfortably with just a president and a couple of vice presidents.

N: By the time that he was coming to the end of his tenure as chairman of the board, had the board become a little more assertive?

McL: Yes. The board was gradually strengthened and more and more functional in the way a modern board of directors should be. There was one large stockholder, O. J. Salisbury--his son is now on the board--who was a member of the board, but just for a few years before he died. And Harold Kingsmill, who had been the president of Cerro de Pasco, came on the board in 1941. He brought a wealth of mining experience but he wasn't very active on the Homestake board for his health was beginning to fail.

The manager of the Hearst-Haggin properties in Durango, J. W. Swent, who was a very able engineer and manager indeed, came on the board of Homestake when he moved from Mexico to San Francisco. He was a very close friend of mine, a close associate, for I had served as a consultant for that company in Mexico also for a good many years--from '27 on. Then eventually I went on his board and became vice president of that company, the San Luis Mining Company, and I'm still on that board.

N: What metal is produced by San Luis?

McL: Gold and silver. That's a much smaller company but a very successful company. The Hearst estate still holds a major interest in the San Luis Mining Company--that's practically around fifty percent of it. The number of stockholders is small and it's not on the market, not on the big exchanges.

N: Is this sort of interlocking directorate common in mining enterprises?

McL: No, not very, and it's really in this case sort of an outgrowth of the old history of the companies, plus having around dominant people, personalities involved who stay with it, and also I think people who are very knowledgeable in mining affairs.

Mr. Swent, for example, who had no connection with either of the families, worked up as a very competent engineer and manager in the San Luis mine. Then when he came up to San Francisco it was a very natural thing to have him with his great skill as a mining engineer and a manager invited to become a director and eventually an officer of the Homestake Company. He became a vice president of the Homestake Company.

N: So in later years, is it correct then that you sought for the board people who were not only able in a financial sense but also had some technical background?

McL: Oh yes. I endeavored to build up the board with people who brought a variety of special talents to us. And my successor, John Gustafson, I think has done a particularly good job in getting very well qualified members with, of course, the advice and warm cooperation of all of us. He has shown great judgment in the people that he had proposed for the board. We have a very well balanced board now. The desire is to get people on who really contribute some way or another.

If there were any outstanding, big stockholder, yes, I think we would want him on the board for there ought to be a representation of strong stock interests. But there isn't any very strong stock interest at present. O. J. Salisbury, whose father was a director, is on our board, and he's a very substantial stockholder as well as a well trained engineer and a most helpful director.

After Mr. Swent retired--he died a few years ago--an old friend of John Gustafson's and mine, John Goss, joined the board. He was the president and general manager of the Magma operations, of the large Magma Company in Arizona, and he brought very special mining skill to the board.

My old friend Ira Joralemon, who served as director for many years certainly contributed geological knowledge of a high order.

McL: We benefited immensely from his wealth of experience in mining as well as his wisdom in a wide range of interests.

Now we have a chap named Vedenesky, Dmitri Vedenesky, who is a brillian metallurgist and had been associated with John Gustafson in the Hanna Company. He was invited to the board, and his guidance, particularly on matters related to metallurgy has been most valuable to us. At present a relative newcomer is Cliff Heimbucher in the firm of Farquhar & Heimbucher--you undoubtedly know Francis Farquhar.

N: Oh, yes.

McL: Well, he is his partner. So he brings us, among other good services, the type of guidance that reflects accounting skill of high order.

Alvin Rockwell, our general counsel here in San Francisco--he's in Herman Phleger's firm--is on the board, and he brings legal talent as well as understanding of the proceedures of large corporations.

Kenneth Kellar from Lead ties us into South Dakota affairs, as well as gives us good advice on legal problems, particularly in the mining field.

N: How does one become invited to join the board? Does the rest of the board vote?

McL: Oh yes. It generally is on the initiation of the president or a small committee. After we had talked over who would be good people to get on our board, we would probably have the Chairman or the President and perhaps some of the other directors think over a panel and express their preference. Then, the question would be raised "Do you think he would accept, and if he would, would he be acceptable to all the members?" So you informally sound out the members and get authorization, if there is general approval, to offer him membership on the board with the assurance then that if he is interested he will be elected.

Charles Park, a professor of geology at Stanford--he's just retired from the faculty there--came on the board in a sense to succeed Ira Joralemon who had retired on account of age. I had Lewis Douglas on our board for awhile. He was the former ambassador to the Court of St. James. He is an old friend of mine and member of an important mining family.

N: Was he also knowledgeable about international business?

McL: Yes. Of course he's a citizen of the world, really in lots of ways,

McL: but he has always been particularly interested in mining because his grandfather managed the Phelps-Dodge operation in Bisbee, Arizona and later his family fortune came from the United Verde Extension mine at Jerome, Arizona. Lewis Douglas is also on the International Nickel Board, and so I see him quite frequently there. He retired from our board after he became involved in things that made it rather difficult for him to get out to meetings. So he retired some years back.

N: Is there a limit on the size that a board can be?

McL: Yes. Generally the by-laws of a company state, "It shall be more than so many and not over so many," so you usually keep a board filled up.

Then the directors, under the law, have to be elected by the stockholders, either for one year or two years. The management puts out a slate to stockholders to vote--"This is the recommendation of the management," but any other stockholder can propose other directors. If, let's say, some group of stockholders that controls a substantial percentage of the stock favors some other candidate they'd have a very good chance of electing one or more of their nominees even though their names had not been submitted on the official slate. A number of companies have been taken over that way in the last five or six years. It's getting to be sort of a habit.

N: In meetings when decisions are being made, do you operate on the sense of the meeting, or are there actual votes?

McL: Actual votes are taken. The directors have the right to fill vacancies on the board and of course that would be by formal vote. And then, at the next meeting of the stockholders, the retiring board submits a slate it recommends for election. It usually includes the previous directors who are willing to serve again, and other names if all places are not filled by incumbents. That slate has to be put up to the stockholders for election, for the directors must be elected by the stockholders, as they serve as their representatives with legal control of the corporation.

N: I see. Then perhaps to take it one more step, if there are policy decisions to be made, are they made according to vote or rather through discussion?

McL: Well, they would be legally by vote. It's a very bad thing in any company really if you have, after full discussion, split votes on a board. I don't think we've ever had anything that you could call a split vote. Some directors perhaps may not be enthusiastic about a particular policy or action, but it will be discussed and then if the management strongly urges it, I think the attitude of the directors would generally be, "Well, the management wants it, we'll do that, but we'll watch it carefully. If it doesn't work out we'll change

McL: it or the management."

N: So there is really an element of personal leadership still.

McL: Oh, very much. The officers of the company are the leaders. It works very much like the University. The president and chancellors are really the administrative leaders of the University, but if the Regents don't like what they are doing they can demand their resignation. A board can put out its officers at any meeting by simply asking them to resign--or firing them.

N: It's interesting that you've had an insight into these two different fields of managing large enterprises.

McL: Yes. Well, the University is a terrific enterprise, and the functions of a board, whether it's Regents or directors, and management are very different. Of course in the University you have the faculty, which has been granted great powers from the Regents. The legal power comes from the Regents, and you might say from the people of California through the Constitution, just as in a company the legal power comes from the stockholders to their representatives, the directors.

Then the directors appoint the management, that runs the enterprise, but the directors determine policies. There are also many current things the board has to pass upon. The management has certain delegated powers generally defined in the articles of incorporation and by-laws and functions in accordance with them in operating the company, under the general guidance of the board.

But an employee of a company down the line should not try to influence things by working on some friend who's on the board of directors, any more than a professor should try to go over the heads of the chancellors and the president by talking about his own interests with a Regent; it's just not the line of authority. Of course, it's neglected sometimes.

N: Right. The lines of authority have gotten rather dotted these days, haven't they?

McL: Yes. But when it comes down to the showdown, the lines of authorities hold. Some members of the faculty don't seem to realize that their authority to perform many cherished functions comes from the Regents, and that authority can be rescinded.

N: I suppose that element of mobility, "If I don't like it here I can go somewhere else," makes them feel a little more free.

McL: Oh yes. Of course anybody can move. Any employee of Homestake can

McL: resign and take his chances on getting a job someplace else. Of course right now the chances of getting a job in another institution are not as good as they were, so the faculty members are apt to be a little more thoughtful. They'll threaten to resign, but the number of resignations will diminish, I'm sure, under the prevailing conditions.

N: Well, that's certainly an element to consider. Thinking again about the financing of mining enterprises and so on, has the stock market decline--the most recent period--posed particular problems for you?

McL: No, not for Homestake. In fact, a gold company really should move against the market. The price of Homestake stock goes up and down with the popular feeling about gold to quite a degree. We recently put out an offer of rights to purchase shares to our stockholders at $35--and it was all taken up, so we are quite comfortably off in cash for our new ventures.

Then the stock went down into the low twenties; it was rather rough but we didn't get many complaints from our stockholders for the market in general declined even more than that shortly afterwards, and now we've been climbing back again. Of course the stock at its present price looks low, but you must remember it's been split about three ways; so really, compared to some of the old stock when I was president of the company, the present stock would be selling in the sixties or seventies.

N: It hasn't missed dividends, I take it, or has it?

McL: No. But, we've reduced our dividend.

Moving Into Uranium

McL: In the last ten years I was president of the company, it was apparent that even though the company was primarily a gold mining company, and it was looked upon that way on the outside, we couldn't help but be worried about having all our fortunes in gold in a period when there seemed to be little chance of any drastic change in the price of gold.

With all costs necessarily rising with inflation reflected in wages and costs of materials we couldn't, despite a very excellent technology, keep our profits at the old levels. So we went into quite an aggressive campaign of exploration for uranium deposits and developing uranium mines. Actually, we did very well in uranium, and acquired a number of good properties that are still profitable and more than offset the decline in profits from gold mining in the late fifties and sixties.

N: Were these uranium developments here or in Australia?

McL: Here in the states. We started with some prospects around the Black Hills, which were small but profitable, and then we got hold of three mines in Utah near Moab, which turned out very well. The ore in one of them was very rich and we made a good deal of money out of it. Another of them that turned out well is just in the final stages of being worked out now. They're about through, but they helped a lot at a critical time.

Then we got into a big venture with the Sabre Piñon Company in which we had a 25% interest at the start. We called this the Homestake-Sapin partners. The uranium deposits that were developed were in the Ambrosia Lake basin northwest of Grants, New Mexico. That partnership opened several mines and built a big mill there that is still operating.

So the profits on uranium kept us from really suffering from the decline in revenue in the years when the monetary policies followed in Washington made difficulties for the gold miners. While I was president of the company that was our principal expansion and it was quite successful.

N: You really have to be able to anticipate.

McL: Yes. You have to look ahead. Now I'm perfectly sure that eventually there will be a much higher price of gold than we have now, but my timing has been off on that. It takes longer than I had expected.

N: Other people don't think quite as fast as you do--that's part of it. [Laughter]

McL: We had a good uranium property on the northwestern side of the Bear Lodge Mountains in Wyoming called the Hauber Mine. It has run out of ore now, but we're doing further exploration around it. In Utah we started with a small mine called the Little Beaver.

That was a small uranium mine, a group of claims we acquired which was adjacent to the Mi Vida Mine that Charlie Steen owned in the Moab area, which was the first great find in that district.

N: Were these all uranium?

McL: Yes. Our best property there was one called La Sall Mine, which turned out to be very rich and very profitable. Another more extensive mine though lower in grade is still operating, though in its last stages. It is called the North Alice Mine.

McL: I don't know who Alice was. It is not unusual to find mining claims named after girls, who range from saints to less respectable females.

Well, that district was one of the most fantastic places. This chap Charlie Steen, who was an impoverished geologist, was in there in the early fifties putting down some drill holes on his own and hit what I suppose is still the highest grade deposit of uranium found on the continent. And that attracted a great deal more prospecting.

Everybody rushed in. A lot of the land was held under petroleum leases, and under the law you couldn't stake mining claims on such ground. Nevertheless, claims were staked with the expectation that the Atomic Energy Commission, that had complete jurisdiction over uranium, would respect them. There was great uncertainty for a while whether any of these claims had validity. Finally the law was modified permitting multiple use, and the claims were validated, but it was like old wild West time for a while.

N: How recent was that?

McL: This was in the early fifties. Moab was a booming frontier mining town for awhile. Before the uranium discoveries, it was a little, quiet Mormon town close to the Colorado River--magnificent canyon country, a wonderful place. But it was really very exciting when various groups with lots of money were competing for claims and starting to develop them.

N: I hope Charlie Steen kept a little money. Did he do well in it?

McL: He did very well indeed, at least at the start. He made a fabulous amount of money. He made a great deal of money, which, according to the latest gossip, he's lost. He was recently reported to be close to bankruptcy. He was a very, very difficult person to deal with--in many ways a very strange person. We weren't successful in doing anything with him, and I'm really glad. Well, I'm sorry we missed an opportunity to develop a much bigger enterprise than we did, but he would have been very difficult to work with.

Eventually some other people, with him, built a mill to treat the ore from his mines there. We should have built the mill ourselves for our own mines, but there I was overcautious.

N: How can one ever know?

McL: No, we didn't have quite enough at any one time to justify building a mill, but if we had been aggressive and built it, why we would have been able to dominate the district. As it was, we did all right.

N: Are there special technical problems in dealing with uranium? Is radiation a concern?

McL: Yes, radiation underground is a problem, and you have to be very careful to have adequate ventilation of the mines to wash out the radioactive gases. It is a problem, and a worrisome problem. The radiation is not a problem in the mills, though, but it is in the mines.

N: Do the miners have to wear protective clothing?

McL: No. There's nothing you can do about it except to keep the radioactive effects down, and good ventilation is one of the best ways to do that. I think it's being successfully done. Of course the richer the ore is, the greater the hazard from the daughter elements that are produced by the decay of the radioactive minerals.

N: Has your knowledge of geology and your success in predicting where gold would be found helped in predicting where uranium would be found?

McL: Oh, there are certain techniques all geologists follow, and in general no one wants to be too involved with one particular metal. In a general way the same procedures are followed. An ore deposit is really a concentration of a specific element that you are seeking.

The problem is what brought about that peculiar concentration. Ore deposits are very small in relation to the geological bodies of the earth, so you try to figure out the particular reasons geologically why they should be where they are and what their associations are that might guide you in searching for them. In uranium, the ores are in certain beds in the sedimentary rocks of the Colorado plateau, but they are in only very limited places in those beds; in some cases related to structures, sometimes related perhaps to the original deposition of the beds. It's complicated, and there are great differences between types of deposits, but broadly speaking the scientific approach is the same in searching for them.

N: When you mine the uranium, is the Atomic Energy Commission your only customer?

McL: At that time, yes it was. At that time the Atomic Energy Commission was the only purchaser and set the terms. They had a published price list for purchasing uranium, and provided various inducements to stimulate prospecting and mining. They would buy ore directly from the small operators. The commission encouraged the building and financing of mills by giving contracts to purchase a stated quantity of the product--called yellow cake--at a specified price. And that's the way we later built two large mills in New Mexico.

When I went into uranium, my feeling was that the profits should

McL: justify the venture within the life of the contracts, which ended in 1966. And they did.

N: Were these twenty-year contracts?

McL: No, less than that. Our contract ended in 1966, but some of them ended at different times. I felt that there was a good chance that we would, under the contracts, not only get our money back and make some reasonable profits, which we did, but that we would still have a valuable property after the restrictions on sale of uranium had been removed. And that is what happened.

Then at the end of that time, I hoped gold would be coming back into the picture. Well, gold's coming back into the picture, but it hasn't come back quite as quickly as I had hoped.

So uranium served that purpose for us. At the beginning there was great uncertainty as to what the price of uranium would be after the contracts were ended, so nobody was counting on that very much. But when the Atomic Energy contracts ended, the nuclear power had then started to come into the picture. By that time the restrictions on ownership of uranium had been lifted, and we are now able to sell directly to the power companies who want to acquire a stock of uranium as a fuel for their big nuclear reactors.

However, they don't want uranium right now because the nuclear reactors aren't built, but they're all looking to the future, and they want their supply of raw material assured. So all our output is pretty well contracted ahead for quite a few years. So we're in a strange position now of selling for forward delivery to the major power companies.

So our uranium activities didn't end when the Atomic Energy contract ended; we're still going in uranium, though not as profitably as we were. So, while I was in charge of the company, we got into the uranium, which has turned out very well.

When John Gustafson succeeded me as president, he was enthusiastically selected on account of his fine record in exploration that had led to the finding and development of certain major iron ores and copper deposits, and also for his experience in the procurement of uranium.

N: He was your student, wasn't he?

McL: Yes, and he'd been very successful with a number of other companies. He was also director of raw materials for the Atomic Energy Commission when the first big expansion in uranium took place, though our

McL: contracts with the Atomic Energy were written after he had left the commission, or left his post under the commission. So he had experience in that field. But he has been, as you would expect from his temperament, stepping out into quite a number of things.

Interest in Other Metals

McL: We have a half interest now in a very big lead operation. That's our most successful new venture, in Missouri, in which we have a 50% interest with the American Metal Climax Company as our associate. The mine has turned out very well indeed. We have a smaller interest in some iron ores in Australia, and then a very nice little silver lead mine at Creede, Colorado. We're doing a lot of exploration in uranium still for new properties as well as continuing our operations in the ones we have.

We have a venture in Peru, which may become a good medium-sized mine.

N: Would that be gold again?

McL: That's lead, copper, and zinc. We're right at the stage where we had to decide to go ahead with that and spend a lot more money and build a mill. With politics in South America as they are at present, we were very reluctant to become more heavily committed, financially so we have some associations with strong Japanese groups that are providing funds and taking our product. They, of course, are very anxious for metal products, and we retain the management.

Problems of Financing Foreign Development

N: Are you apprehensive at all about having your holdings expropriated by the government of Peru?

McL: Oh, everybody's apprehensive about what could happen in South America. As I mentioned earlier, the present government of Peru is extremely nationalistic, and they have imposed restrictions on mining there that are going to make it very difficult to raise large quantities of money. We're small, but we are talking in the neighborhood of $10 million or something of that sort for developing this property down there.

A company such as the Southern Peruvian Copper Company, which

McL: is American Smelting and Refining controlled, or Cerro de Pasco, is now faced with some very bad legislation, under which they have to submit plans and financing for the development of any additional properties they own. All mining companies like to find and get hold of new properties to take the place of other ones that are worked out.

These properties are held by what were perfectly legal mining claims, but now the government demands that plans for their development must be submitted and complete financing assured by a specified date--generally not far in the future--or you lose them.

N: You can't just hold them until you need them?

McL: No. So in southern Peru there are two big new properties that will cost over $300 million to develop. Cerro de Pasco too had a couple of properties of that magnitude. Well, it's silly; you don't want to develop them overnight; you'd flood the copper market if you went at it too fast, yet they're forced to submit their plans and the financing. Under the circumstances it is difficult to raise the money for it up here.

N: I see. Yes, you are really hemmed in.

McL: So they're caught in a very bad way. Our little show, however, went over all right. So those big companies are faced with some very great worries down there.

N: Is there any move at all to have some sort of joint partnership with the local nation participating?

McL: Oh yes. Certainly today you wouldn't go into any new venture down there without trying to get participation with local people or a government agency. Unfortunately, there isn't enough private money down in those countries for such major financing. Of course, the government in most of those cases is likely to want a free ride, or their contribution financially will be restricted. To some extent there have been cases where the government is going along as a partner, but even that's being threatened now.

N: I see. I was really thinking perhaps less of their financial contribution than of their interest in cooperation through whatever benefits they would get.

McL: Well, in the early stages you're always given great inducements to come in and spend money, but after you get something going successfully, then you're an exploiter of the wealth of the country.

Again I am reminded of the cartoon in the New Yorker of two

McL: Arabs who were sitting up on a hill looking over where a big refinery was being built. One said, "Well, shall we go down and take it?" The other said, "No, wait 'til it's finished." [Laughter] Which is about the situation that you have to face. It naturally makes one very reluctant to put up more money.

N: Yes. You must be wary, it seems.

McL: Well, we have very little of our stockholders' money at risk down there.

N: These developments are really fascinating. I was thinking about what a nice balance you're striking elsewhere. You're mining uranium on one hand and on the other hand lead, which is good.

McL: Yes. We've become quite diversified, though Homestake is still regarded primarily as the great gold mining company. In fact, the mine is the largest gold mine outside of South Africa, I'm sure, in both the total production and in the annual production. But at the moment it's not contributing to our profits anything like it should.

Naturally, anything that happens to the price of gold is very critical. At times, we have produced close to 600,000 ounces a year, so every dollar additional over the official price adds a substantial amount to our income. But under our present labor contract labor gets half of the additional income when the gold is sold above the official price of $35 per ounce up to $47.

Labor Relations and the United Steel Workers

N: This introduces a topic I hope we can talk about a little. Have you then participated in labor negotiations with the mining unions?

McL: Homestake was non-union for a long time. We had a number of certifying elections, starting when the United Mine Workers moved in on us and tried to organize our employees under the then existing labor law. They were overwhelmingly defeated. Our boys turned them down about three to one.

Then we had several other unions make similar attempts that didn't carry. We had several elections with the United Steel Workers, and we usually won those elections about three to two. But then about four years ago the union won the election.

N: So that was around 1966 in Homestake?

McL: Yes.

N: Which union was this?

McL: The United Steel Workers. Oh, there were various reasons. During a time in which you have to economize you have to be much stricter, you can't help alienating some of the support. While I think some of our old-timers thought it was the end of the world --the union came in and we had to deal not directly with our employees but through the union--it hasn't been too bad.

The first contract was one we could live with. On the second contract, while they made demands that would have shut us down, after the negotiations really got under way it was apparent they didn't want to shut us down. They wanted to get all they could for the men--that's reasonable--and we wanted to protect the stockholders.

So again we have a contract that I think we can live with, but we can't operate at Lead and pay the salaries that some of the other mining companies in the West are paying, because profits would just disappear.

We have a contract in which, as the price of gold increases above $35 up to a limit of I think it's about $47, we split the additional revenue with the miners, which is a fair basis. After it goes beyond a certain figure that seems high now--that is, if gold goes to $70 then we would have to have further negotiations.

When it does, the bonus based on the price of gold will undoubtedly be eliminated and wages will be set at rates comparable to those in western base metal mining districts. Then we'll be better able to pay such wages.

N: Is it just a year's contract?

McL: Three years. We're in the first year of the new contract.

N: How do you account for the fact, then that Homestake was relatively late in becoming unionized?

McL: I think we had a record of fair dealing with our employees that had developed great loyalty in the people out there for the company. We're a rather isolated mining group, and a great many people have been with us all their lives.

Most of the people running the company are people they know--that is, the local people; they even know some of the directors and most of the top management. Of course, I've been up there a lot. The managers have all been well liked.

McL: Guy Bjorge, who succeeded Yates, was very well liked in the district, a very fair, very efficient, admirable person. Abbott Shoemaker, who succeeded him, also was highly respected, and James Harder, the present manager, is a former chief geologist who grew up in Lead; most of his life's been there, so he's just one of them.

So there's a good local feeling that you don't find in many mining districts in the country, and the company has been generous in its support. It has a good pension system; it's had a hospital that's been maintained from the early days which gives practically free service for most everything, even for pensioners who live there.

By and large the company's reputation with its employees was very good, but when you have to economize and put on some of the screws, when you've got to retire a lot of the old-timers--you're not apt to be as popular as you were.

With younger people coming in from the outside who are less familiar with the old records, they just felt that they ought to get more than they were getting.

Basically our wages have been lower than in the other western mining districts. Most of the work, however, is organized on what we call the contract basis. A man or a team of men is guaranteed a basic wage but they are paid according to the number of feet of a drift or a tunnel they deliver, the number of cars that are hauled, the number of tons broken, things of that sort.

There really is a good premium that they can earn by more efficient work. The company supplies the tools and gives the directions as to what they should do, but there is great opportunity for the able miner to make very handsome earning, really very handsome earnings, $15,000 to $17,000 or even up to $20,000 a year, which are not bad salaries for workmen.

They make that through the contract system, and that has attracted good workmen, because a good man can do very well. Unions don't like that system very much because they prefer to get the day's wage group and have a big labor force of that sort. It gives them much more control, but our contractors are now part of the union too, and they're a very skillful lot of people. A company really depends upon getting able workmen of that sort into the operations.

N: Do you find that you can retain people in the employ of the company?

McL: Yes. The good contractors will stay with us.

N: Does a man contract just for himself?

McL: No, it'll be a small team--three or four together.

N: Is safety an element in gold mining?

McL: Oh, yes. Mining is hazardous, just as building a skyscraper in San Francisco or a bridge is hazardous. Any great engineering project has certain hazards, and a good management just has to do its utmost to reduce the dangers.

The greatest danger is with new men, untrained men, unskilled men, who don't respect the safety rules as carefully as the experienced man will and don't realize what hazards exist.

Any mine, of course, has special dangers, but we don't have the danger of explosions, such as a coal mine would have. There is a certain fire hazard from timber in the mine, which has to be watched, though it's not an excessive fire hazard. It's probably less that the fire hazard in a steel skyscraper and much less than the fire hazard in a three or four story wooden building.

N: Do you have water problems?

McL: No. We have a rather small amount of water in the mine. Most of the water that we pump is really water that is used to distribute sand for filling the stopes, or the places from which the ore has been extracted. That water has to be pumped back, and that has to be handled very carefully to avoid any accumulation of water or a rush of water or anything of that sort.

N: Do you have falling rocks?

McL: The rock is very firm, very strong, but after any blasting you have to be very careful that all the loose rock overhead is worked down, pried down, so that a man isn't caught by a fall. You can't eliminate the hazard in mining of a rock dropping off and hitting or killing somebody, but by and large, as industries go, I think our record's very good. Our major casualties up there are on the highways. I think that many more of our people have been killed in automobile accidents in the Black Hills than in the mine.

N: During the days when there were these various attempts at coming in and forming a union, was John L. Lewis involved in any of this, do you recall?

McL: Lewis was still alive when District 50, that was a unit of the United Mine Workers, moved in on us, but I doubt if he had much to do with it.

N: Are there any individuals who come to mind with whom you dealt on the labor side?

McL: Well, I didn't deal with any of them directly. I'm not good at that sort of thing.

N: I should think you could charm them very easily. [Laughter]

McL: Oh, that doesn't work. You need tough-minded people. We dealt with a much lower union echelon; we didn't deal with the top people.

N: But that has been resolved at this point?

McL: Oh, we've got a contract, yes, and I think the sharing of the premium on gold is temporarily a very good thing--at least until gold goes much above the $40 per ounce. It makes the miners interested in what's going on; they appreciate our problems, too. So while the negotiations have been rough and harsh, nevertheless, I think both sides feel that we've got something that we can work with.*

N: Has the United Steel Workers also entered into the uranium mining?

McL: No. Strangely enough, we have no union in our one big operation in New Mexico. We've had several elections, and the miners have turned down the union. So we have a non-union operation by vote of the men. How long we'll keep it I don't know. I think it's very complimentary to our management down there. They were able to do it, and that was in a hotbed of unionism.

N: In New Mexico?

McL: Yes. We're the only non-union big mill down there. It's been very gratifying.

N: That is interesting. Thinking back a little to some of the earlier days of Homestake, there was a note in the Fielder book that President Coolidge had visited the mine. Do you remember that?

McL: Yes. He came to the Black Hills the summer before the end of his term. He and his wife and family were down at a lodge at the Custer Game Park, a state lodge. Mrs. Coolidge visited Lead but as far as I know, he didn't. He didn't show any enthusiasm or interest in it. I wasn't there.

N: He wasn't a man to show much enthusiasm for much of anything.

---

*A study of the relationship between management and labor at the Homestake up to 1942 has just been published by the Iowa State University Press (1973) in a book entitled Working the Homestake, by Joseph H. Cash.

McL: He did make his famous announcement that "he did not choose to run," which was a good Yankee expression, while he was out in the Black Hills.

President Taft was underground in the mine, then Senator Taft, when he was running in the primaries, came to Lead, and he made a trip underground. We had some photographs taken to commemorate his father's trip.

N: So you did have a certain amount of attention from political figures?

McL: Oh, yes. We got a certain amount of attention.

N: There was a reference also earlier in the history of Homestake to the hiring arrangements. It was something called rustling--it sounded like the old waterfront shape-up.

McL: Oh, whenever there's unemployment there's always a line of people seeking jobs out there, and that you generally call rustling--where you're rustling a job. In the early days out there, the man who was in charge of the employment office just happened to be a rather dominant character. I don't know how dominant he was, but he had a lot of authority and the right to say who was taken and who wasn't taken. I think in the early days a lot of those people were pretty brusque and not too gentle in the way they handled things, but that was typical all over America.

In the Depression, when Homestake was the one bright spot in employment, there was an extremely long line of people seeking jobs, a rather pathetically long line. That's because this was one of the few places where jobs were available.

Of course, there's a harsh saying in mining that there's no shift boss who can maintain discipline as well as a long line of people looking for work. When there's a long line of people looking for work everybody who's got a job is very attentive to his job to make sure that he keeps it. It's a harsh thing, but there's no doubt about it--if you're in a Depression and you see a dozen people out there anxious to get your job, you'll be awfully careful not to lose your job.

N: What is the situation now?

McL: Now we're short of men. We have a hard time getting the miners we want.

N: This is primarily in Homestake, or in the others also?

McL: It's true everyplace, even in Canada. There are jobs or so much welfare available that a man doesn't have to take that type of work, and mining work isn't popular.

McL: You always get enthusiasts about mining--some people who like it very much--but also a man who goes down into a mine for the first time is apt to be pretty unhappy until he really gets accustomed to it and gets excited about it and becomes a miner. You lose a lot of men simply because they don't like going underground in a mine, working with only light from their mine lamps, and so on, and it frightens some people.

So unless general conditions are really quite bad in the country it's hard to maintain a good flow of people coming through. You need lots of people to go through and be tried out and to find out whether or not they're good miners. The poor ones generally leave--and we are eager to keep the good miners who can earn the highest wages.

We've had a very poor experience in trying to induce the Sioux Indians to come in the mine. That is, under this present emotional binge about everybody being equal in this country, you're supposed to have the mix of the minorities, that is representative at least of the local population.

We have very few Negroes up in that country. They practically never apply. But there are a lot of Sioux Indians who are on the nearby reservation, and there is a feeling now they should be worked into the economy. But they haven't been at all satisfactory in the mines.

N: Are they reluctant?

McL: Oh, they come, try it out, and then they just quietly leave. They don't conform to the disciplines of having to go down at a certain time, of being on time, being there, and being regular. Or conforming to safety regulations. That type of life doesn't appeal to them. And their weakness for alcohol doesn't help.

On the other hand, in New Mexico some of the Indians down there have been very excellent in the mines, and the Mexican-Americans. Down there they call themselves Españoles.

N: Not Chicanos?

McL: No, they're Españoles, and the whites are called the Anglos. There's a story of a bootblack, a Negro in Sante Fe, who was shining a white man's shoes, and he looked up and said, "Well, all us Anglos have got to stand together." Because of the Españoles.

So we're dependent really on mostly the Españoles down there, and to some extent the Indians, and there's a very substantial group of Caucasian Americans in mining down there too. So we've got a good staff.

N: One used to hear of mining families in which one generation after another

N: would go into the mines, but I take it from your description that this pattern is subsiding now.

McL: It is still true in Lead, where the mine has been operating for over ninety years. But in New Mexico we started in the fifties, you see, down there, and so there's no local background at all. There is, of course, a great mining tradition in the Southwest, though not in this particular area. You have to build up a whole big mining community from the outside, when a new mine or district is opened up, and that is a job.

N: Oh, you had to make a town?

McL: Well, yes. The town was just a little sheep-loading station or carrot-loading station on the Santa Fe Railroad--Grants was just a tiny little town. It's on the Santa Fe Railroad about eighty miles west of Albuquerque, and it became quite a booming town. It's not an attractive place; it just looks like one of the usual roadside slums when you drive through it. It's strung out for about a mile or two along the main highway through there parallel to the Santa Fe tracks.

There's been a group of companies involved. We're only one of the original four large companies. Each one of them built its own community. A lot of money, many hundreds of thousands, even millions, went into building of houses to take care of the employees.

The communities well back from the highway and the tracks are far more presentable.

Potash in Canada

N: As you've been describing your venture from gold into uranium and lead, and so on, is there a further step that occurs to you?

McL: Oh, we're constantly looking for new things, but I would like to confine our efforts to fields in which we have particular experience. We did move into potash, about which I was not enthusiastic at all.

It was a very big venture up in Saskatchewan with the United States Borax and Swift and Company. About $80 million was invested in that property, and we had a 40% interest. The potash market has recently become very weak. Fortunately, we were able to sell out to Texas Gulf Sulphur, who needed a potash position, and I was greatly relieved when we got out on fair terms, including a retained interest without liabilities that may prove very valuable.

N: Is potash used in industrial...?

McL: Fertilizer. It's an indispensible fertilizer. Without potash I don't think the world's population could be adequately fed. One way to control population growth, would be to do away with potash. But it would be rather a harsh procedure.

Potash, phosphates and nitrogen are the three ingredients of fertilizer, and, as so often happens in our free enterprise system, the opportunities in that field were appreciated and realized and exaggerated by too many people.

One of the first and most successful was the International Minerals Company, and there were many others. Just too many got into it. I had hopes, though potash was not anything I was enthusiastic about at the time, that the cost of opening up deep potash mines in Saskatchewan was so great that not too many would come into production. But there was a period when everybody under the sun was rushing in there. And they're very costly.

You had to go down four thousand feet, in part through a permeable formation called the Blairmore that was full of warm salt water under terrific pressure. It was really an underground river, and the only way you could get down was to freeze a great block of ground and then sink through it. Heavy cast iron tubbing had to be installed to hold the walls of the shaft until you got down into solid rock below. Very tricky, very costly, and still very dangerous.

The tubbing had to be tight enough and strong enough to hold the water. The salt layer itself, in which the potash occurs, is so tight and impermeable that no water gets in. The beds of potash are relatively thin layers in a great thickness of rock salt. At least one of them extends for miles more or less horizontally. Potash looks just like common salt.

N: What an inconvenient way to mine.

McL: Oh, yes, and it's a very elaborate, costly venture. But, once the shafts are down, the horizontal layer of potash minerals can be mined relatively cheaply, with large cutting tools and a lot of other fine equipment. But utmost care had to be taken to prevent any subsidence that would crack the overlying formations that are full of water under great pressure.

The product of the mills is a nice, pretty white salt. But too much of it was being produced and sold for even the growing market to absorb.

N: Are there any opportunities in Alaska that you might be interested

N: in?

McL: We're not in anything in Alaska. Of course somebody will find some more things, I suppose, up there.

N: This venture into Canada--is Canada beginning to be a little resistant about American investment also, do you feel?

McL: Yes, I think it is. There's a very strange anti-American feeling in Canada now. Again, it's the case that they want money to come up there to undertake expensive exploration and develop great mines and plants. The Canadians are not inclined to provide enough of their own money; then after you get something developed and in profitable operation, the Americans are criticized for wanting to maintain control of it. It's very difficult to raise money in Canada. We would have much preferred to have had strong Canadian partners in the potash venture, but none with adequate funds seemed to be available when needed.

XII SOME PERSONAL NOTES, AND A FAMILY HOME IN BERKELEY

The Cranmers of Denver

N: Could you tell me a little about your wife, Sylvia, and her family?

McL: Sylvia is the only daughter of George and Jean Chappell Cranmer of Denver. Each of her parents has been involved in a wide range of affairs there and their many contributions to the life in Denver have been very graciously recognized, particularly in recent years.

Her mother, a musician herself, has helped many young artists, and has also served on the board of the symphony and aided several chamber music groups. Recitals in their house were frequent, and many ended as dancing parties.

Sylvia's father graduated from Princeton with the class of 1907. After he retired very wisely as a broker just before the 1929 crash, he served as manager of parks and improvements for Denver for quite a number of years. In spite of the Depression--or perhaps because of it--an extraordinary number of major works were completed under his direction. He was the moving spirit behind a long list of projects that include the airport, water tunnels through the Front Range, the Red Rock Theater, the Winter Park ski area, various parks, and other odds and ends that have added immensely to the attractiveness of the city.

The park in front of their house at 200 Cherry Street is now called Cranmer Park. A broad platform with a monumental stone sundial in the middle of it--all designed by George--is one of the sites most visited in Denver, particularly by those seeking a view of the Rockies.

I met him first in 1934 when he was negotiating with a New York group--Case, Pomeroy & Company--for the financing to bring a a gold mine in Colorado into production. As a consultant for the

McL: firm at the time, I was asked to inspect the mine which I did. Unfortunately, I had to decide it wasn't promising enough--and recommended against putting more money into it. George Cranmer, however, didn't hold it against me--perhaps he was relieved--for I continued to be invited to their house when I happened to be passing through Denver, particularly in later years when I was in charge of the Homestake Mine.

Marriage to Sylvia Cranmer

McL: And so, I met Sylvia, after she had graduated from Vassar in 1939. We saw a good deal of each other in the years after the war after I had returned from my second tour of duty in Peru and had joined the Homestake Company. We were married in 1948 during the Christmas week and started our life together on Hawthorne Terrace in Berkeley--first in the house I had bought for my mother and after 1955 in this house designed by Gutterson for the Sperrys. It was built shortly after the Berkeley fire. So here we are, with a most convenient base for the rather complex life we both enjoy.

Besides being very helpful in my scattered activities, Sylvia has become very much interested in many aspects of conservation--sensible ones not in conflict with my concern about the supply of metals and mining. In this connection, she has been very active with the Save-The-Bay organization that she started with Kay Kerr and Esther Gulick some years ago. She is also on the executive committee of the board of the Audubon Society and commutes to New York about as often as I do. Sylvia has become so well known in local politics that candidates value her endorsement much more than mine. I'm really never asked any more.

I have always enjoyed large houses, probably a result of my early life at the Hacienda. The Cranmers' gracious house in Denver was another for which I have particularly happy memories--and now this pleasant place--fairly sizable at least for Berkeley--continues the pattern though on a much more modest scale. Of course, its most important function has been to provide the family with warm and cheerful surroundings, particularly as Jean and George were growing up. Berkeley, in spite of the current turmoil, is really a place where one can combine a city life with easy access to country--the hills and the coast that mean so much to us.

It hasn't been dull, I can assure you--and it still is a life full of adventure and sometimes surprises, generally pleasant and always stimulating.

Walter Case and Case Pomeroy

McL: Probably I should also say a word or two about my association with Walter Case, for that was one of my extra curricular activities while I was at Harvard that was rewarding in many ways, in addition to the introduction it gave me to the Cranmers and Sylvia. A number of other good friendships too came from it, as well as involvement with new and exciting projects in various parts of the world.

My meeting with Walter Case came about after he had become a major stockholder in the Homestake Company in the early years of the Depression. His company with the aid of Thorold Field--a truly discerning and able engineer--had participated in the finding and development of the great Roan Antelope Mine in what was then called Northern Rhodesia. It grew into a major copper producer under Chester Beatty's direction, and did very well financially for Case Pomeroy. With rather rare judgment, however, he decided that gold in the thirties would be better than copper and so shortly before the market debacle in 1929 he moved out of investments in base metals and into gold mining enterprises.

This led him to become a large stockholder in Homestake. I first met Walter Case when he called on me one morning in Cambridge with a letter from Edward Clark authorizing me to give him my views about the geology and the prospects of the mine which he felt they were then entitled to know on account of the firm's substantial commitment. I did just that, with some enthusiasm. I remember he advised me to borrow all the money I could and buy Homestake stock. I didn't have the nerve to put dollars where my convictions were--and so lost another chance to make a fortune except on a very small scale, commensurate with my academic salary.

Some months later, I was invited to join Case Pomeroy as a consultant on mining ventures except anything concerned with Homestake. With regard to it, however, information was to be sought only through the management in accordance with lines of authority and respect for what should be disclosed to all stockholders. This was strictly observed and my relationship was a very pleasant one. Walter Case had a number of extraordinarily able associates, such as the distinguished economist Walter Steward, who later joined the Institute for Higher Study at Princeton, and Sumner Pike who became one of the first members of the Atomic Energy Commission.

In connection with the firm's activities, I was in London for part of the summer in 1934 when investments in South Africa were under consideration and when an exploration program for gold in Australia

McL: with W. S. Robinson was being organized. Robinson was a brilliant person--truly a leader in many fields--with broad interests that went far beyond his responsibilities as chief executive of the Zinc Corporation--one of the largest of the mining companies at Bunker Hill.

I had the responsibility of engaging the geological staff for the work in Australia and really did rather well in assembling a group of brilliant young men, practically all of whom achieved distinction in their professional lives. John Gustafson, now Chairman of the Board at the Homestake Mining Company, was one of them, as was Hugh McKinstry who later succeeded to my professorship at Harvard--and several others of comparable stature.

The Western Mining Corporation had been formed about that time or a little earlier by Robinson. Case Pomeroy participated in some of its ventures. Two of them-the Norseman Mine in Western Australia and Gold Mines of Kalgoorlie--became moderately successful and even managed to survive through the later years when inflation and unwise monetary policies made trouble for the gold miners.

Gordon Lindesay Clark was then one of the bright young men in the Western Mining Corporation. Now he is Sir Gordon, after having guided the Company with such extraordinary skill that it has become a major producer of nickel, uranium and other metals--a result of good geological judgment--plus a bit of luck which is an indispensable ingredient in any formula to success in mining. But above all it was his wise decisions and aggressive leadership at critical times that led to success.

In 1935, I took a half year off from my Harvard duties and spent most of the time in Australia and South Africa. A trip around the world in those days was still by steamer. I wanted to fly from Johannesburg to London--which had then just become an established commercial service--but Thorold Field, whom I had joined in Johannesburg, persuaded me to accompany him by sea--and a rather memorable voyage from Cape Town via Madeira it turned out to be.

In addition to investment in the going mining companies in South Africa at that time, Case Pomeroy had become interested in a very speculative venture in the region that became known as the Far-East Rand. There, it was suspected that rocks of the Witwatersrand series, in which the gold-bearing reefs occur, might exist under relatively thin cover of later sediments and lavas known as the Karroo System.

An American--an imaginative and aggressive person from Brooklyn named Kapnek who had acquired title to a large block of the ground--had promoted the venture, for which he secured financing from Case Pomeroy and others to undertake a rather costly drilling campaign.

McL: The first holes did establish the existence of Witwatersrand beds uncomfortably under rather thicker cover than we had anticipated. In one hole at least there were conglomerates very similar--except in lack of gold--to the reefs forty miles or more to the west.

The project was interrupted by the war when gold mining entered a period of reduced profits and neglect. The concept of a Far-Eastern gold field, however, persisted and much later the Union Corporation--one of the great mining houses of South Africa--acquired extensive holdings not many miles away from the area we had drilled and eventually discovered a major gold field that now supports several successful mines. It is now known as the Evander area and the annual production of gold in current years has been worth around $70,000,000. So we were on the right track but financial courage understandably--but still sadly--ran out.

Walter Case's tragic death in 1937 was another factor that led to the abandonment of the project.

Maynard Keynes and the Dow Jones Index

McL: In the summer of 1934, when I was in London, I first met Maynard Keynes rather briefly. He was not uninterested in becoming involved in successful business ventures and I am told he did rather well in his personal affairs, even though being "in trade" was rather infra dig in England for a person of his stature in the academic world as well as public life. The last time I saw him was much later at a luncheon on New York of a little group--about eight of us, Californians in exile, so to speak--that had for years met every three weeks or so to settle the affairs of the world by making bets of one dollar.

This particular lunch was at the Federal Reserve Bank and Allan Sproul, who was then President of the Fed in New York, was host. I remember we had a pool that day on what the Dow Jones index would be a year later. After our numbers were in, we, of course, compared notes. Keynes had the high field, way out in the blue yonder. He commented that he was sure he was right but that his timing was generally wrong. It was, for the Dow Jones is now way beyond his figure but it took much longer to reach it, and he had died before the year was up. So we kept his dollar.

After reviewing the cryptic notes in my very abbreviated diaries, I am afraid that I have neglected a lot of the personal relationships that really made most of the things I have been talking about much more interesting, at least to me.

XIII GOLD AND THE MONETARY SYSTEM*

N: Did you say you will be talking about gold at a meeting?

McL: Yes. At St. Clement's church. The men's club has a meeting over there. I don't know whether it's monthly or bi-monthly. I was invited to talk again about gold, and I always like to do that.

N: What sort of thing do you discuss when people ask you to talk about gold?

McL: This was the question of the place of gold in the monetary system, which is one of the great problems the country's facing. Really, as I see it, there's a great conflict between the concepts of fiat money and a monetary system backed by gold. I'm sure gold's going to win in the end.

It's all tied up, I think, with the terrible problem of inflation. I'm sure the economists and the bankers and the money managers in Washington just don't know how to solve it. Look what's happening: we're getting a depression and inflation at the same time, which is going to be pretty appalling. I wish the Nixon administration would wake up and follow the advice which I have been offering for a long time! [Laughter]

N: Please tell me once more what your position is.

McL: I favor doubling the "price" of gold in dollars--or more correctly stated, reducing the official gold content of the dollar by half--and then restoring the disciplines of the old gold standard at the new price. Other currencies would be adjusted to the new dollar and there probably would be little change in their relative values. It would

---

*Note: This interview took place on May 15, 1970.

McL: amount to an offer to settle our foreign held debts for half the quantity of gold we had promised to pay. Now we simply haven't the gold to pay the obligations in full. With the write-up in the price of gold and then the liquidation of a substantial part of the debt in dollars, it should be possible to achieve a better-balanced economy on the new basis and to check inflation without creating a depression.

N: When you say, "write off 50% of the debt..."

McL: If gold were doubled in price to $70 per ounce, there would be on the books a great increase in the currency value of the gold reserves. We have, for example, some $10 or $11 billions in gold in the Treasury, and doubling the price of gold would put that up to $20 billions, let's say. Now we have against that gold some $40 billions of claims in dollars in the hands of foreign central banks and in private hands abroad that we have guaranteed to redeem in gold--and we haven't the gold to do it with the dollar unrealistically valued in gold at $35 per ounce. A portion of those claims could then be paid in gold at the higher price, which would mean they were getting half as much gold as they now could claim. But what's the use of claiming the full quantity of gold when they couldn't get it? The gold doesn't exist.

Then if the gold standard were restored and currencies made convertible into gold at the new level, debts between countries could be settled in the old way by movements of gold, instead of having the Europeans accept dollars, which they are now reluctant to do and won't do very much longer. Actually, they're not doing it now.

These new devices called "special drawing rights," which have been created as means of settling deficits in international payments are simply a form of fiat currency on an international scale. The countries that have agreed to accept these special drawing rights really agree to accept these pieces of paper for the goods that they've sent abroad.

So I think a great showdown is not far off. Of course one school and it's the predominant school in Washington and among our bankers and economists--holds this view that gold is on its way out, that it's an anachronism that's going to disappear, and the whole world will have a managed currency. They don't say it would be a fiat or authoritarian currency, but that's what it would be with nothing except the authority of a government behind it.

In contrast, the older idea was, you'd have a money based on gold, and you could go just so far before people who had the right to collect gold would turn in their paper for gold. That would have a great restraining effect on the management of our money.

N: Would this, then, put an ultimate limit on financial expansion?

McL: It should make it easier to control the excesses that produce inflation. A government couldn't go on indefinitely running a deficit year after year and meeting that debt by printing more paper money; that's what we're doing. We've had deficit after deficit in the country due to our extravagant governmental procedures. Under those circumstances a corporation or an individual would go bankrupt--but a government can meet it by directly or indirectly creating more paper money.

Our usual device is to put out more bonds; the federal reserve banks take the bonds that are not absorbed by the public--and they go into the banking system, and more money, more credit, is created. It is practically the same as printing more paper money.

That is basically the cause of the inflation, and the rest of it--the pressures of labor, or the pressures of the manufacturers to put up the prices--is just the inevitable response of those people in trying to protect their own interest as the dollar depreciates in purchasing power. The laboring man sees the purchasing power of his wages constantly being eroded, and so he demands more wages. By and large their demands have had more power than anything else, and the laborer has done pretty well.

Even University professors with a 5% average increase for quite a long time have done better in terms of inflation than many. That's a pretty unpopular thing to say, but I think the professor today, with the salaries that are paid today, is better off than the professor, say in 1925, when I started. My salary as full professor at Harvard was $6,000. I noticed Lawson's salary, here in Berkeley, on an old Regents' record, in some....

N: That's Andrew Lawson?

McL: Yes. I've forgotten what it was, but it was about $2500 or $2800! [Laughter] I don't think the Lawsons were living as well on that as they were on his later salary, though I think by and large the academic world has a little more than held its own. Of course we can argue they should have been paid better all the time.

N: But it doesn't destroy your thesis. If you'd like to talk a little more about the problem of the gold standard, please do. And forgive my ignorance: I can only ask you very simple questions, but I hope you will elaborate on them.

If the price of gold were pegged at $70 instead of $35, would you still envisage the international banks being held at one position, and then having some sort of free market as we have now?

McL: I would then like to see the various currencies made redeemable in

McL: gold at their official price. I don't mean changing the price of gold would be in dollars alone; all the currencies would probably change in their gold content at about the same rate, so that there would be only minor differences between the relative positions of the currencies.

The Two-Tier System

McL: But there would be a free market in that the restrictions on ownership of gold by individuals would be removed. As long as you could take your paper dollars to a bank or treasury and turn in the paper dollars if you wanted and get gold for themat the official rate, that would be the price of gold. So the "two-tier," so-called, system of the price of gold would disappear.

The present two-tier system in the price of gold really resulted in March 1968--the Ides of March I like to call the date--when on a weekend the various central banks, led by the American treasury, took the position that the banks or government agencies would no longer sell gold or buy new gold from the mines, and that they would deal in gold only among themselves at $35 an ounce, and there would be no attempt made to hold the price of gold on the open market.

At the same time, the domestic gold producers then were told that they could sell their gold to the people who had a legal right to buy it, at whatever price the market would command. So on that weekend, our company, which is the largest gold producer probably in the world, outside of South Africa...

N: This is Homestake?

McL: Yes. Our company was told that on Monday its one client, who for the past history of the mine, had taken all the gold at the official rate--had insisted on it--would no longer take our product. On Monday! So we had a very busy time scrambling around to find customers.

In two weeks we'd disposed of all our gold--all our production--directly to domestic manufacturers who had licenses to purchase the specific quantities of gold needed in their operations and that's the way it's been ever since.

The price on the London market, after the treasury stopped putting in its own gold to hold the price at $35 went up to $43, or something like that, over a few months. Then it's subsided, now, practically back to the $35, largely due to the high interest rates which made it costly for people to hold gold, and the strong-arm

McL: effort of our treasury and money-managers to try to force the price down and to force South Africa to put all their gold on the open market. This was in clear violation of the terms of the International Monetary Fund agreement, which gives South Africa the right to sell its gold to the Fund at the official rate in dollars if it chooses. It's a strong-arm attitude on the part of our government, and I think completely outrageous bullying of a smaller country.

N: Who do you feel developed this policy? Who was the advocate?

McL: Oh, this is a long standing policy. It's gone on through Republican administrations and Democratic administrations. It's the bureaucrats in Washington that drift along, survive any change in administration, who are the intense opponents to gold.

It started in the Roosevelt period, when Roosevelt really wanted a free hand to inflate.

N: This is Franklin Roosevelt?

McL: Yes. Once you get a country indulging in the intoxicating effect of inflation it's very difficult to correct it.

N: Thinking back to that weekend when the Homestake Mine learned that the treasury would no longer be any sort of customer, what other customers did you find?

McL: It's a very interesting situation, because the industrial uses of gold, using the term in a broad sense, in the United States require four times as much gold as the domestic mines produce.

The biggest use is in jewelry; then of course a substantial amount is needed for dental alloys. There's nothing that is as good as gold on account of its resistance to all acids, body fluids, and the like. Strangely enough, that's quite an important use.

Gold also has a growing use in electronics where clean surfaces that don't tarnish are needed, and you want to be perfectly sure that electrical contacts are going to be reliable. Gold is almost the only metal that gives you an absolutely clean contact without any danger of corrosion. I suppose platinum would too, but platinum's much more expensive that gold and not as easy to fabricate. There's been a growing use of gold in all the industrial countries.

In the United States, though, we can sell gold only to the people who have a license to buy a specific amount for specific purposes. It's not a free market, but it is a substantial market. We can't sell gold to any individual, who doesn't have such a license.

N: Were you able to sell gold to a foreign customer?

McL: Yes. We can sell gold abroad, but in European markets, of course, the vast production from South Africa is available. That amounts to about a billion dollars a year (at $35 per ounce). Our production is relatively small in this country--$50 or $60 million. South Africa is the dominant producer. There have been various studies made recently and there's a good deal of difference of opinion as to just how the gold going into the non-monetary uses is distributed-how much is going into hoards, or speculation, as people might call it, because the statistics are not nearly as good abroad as they are in this country. Nobody can buy gold in this country unless they have a permit.

N: It's a governmental permit?

McL: A treasury permit. We can't hold even our own gold beyond a certain quantity. We have to sell it, and the government won't buy it. We are permitted to hold only a small inventory. Any amount in excess of that must be sold. We can't sit and hold it, and we can't even give it to our stockholders as a dividend. We have to sell it. Our other alternative would be to curtail or stop production.

I'm sure there was a feeling that this strict control was going to force the price of gold down, which some of the treasury and money-manager boys would like to see. That isn't going to happen, and it hasn't happened. For a time the price went back to $35, but it's already started to rise again and I am sure it will continue. However, I'm just a gold miner--I'm not an economist--but I can't help being interested in those problems.

There is pretty good evidence that the industrial uses of gold, on a world-wide basis, are increasing, so it is predicted that within a few years practically all the gold,even the South African gold, will be consumed for such purposes at the market price.

N: If you predict that industrial uses will absorb the gold production, would there be enough gold for monetary uses to sustain an expanding economy all over the world?

McL: I think there would at the right price. A higher price for gold would restrict the consumption of gold to the essential uses. There would be some modest reduction in the uses of gold, and a doubling of the price--some people say it will have to be more than doubling the price--would give a basis for the monetary system that I think would be very sound.

When one thinks of gold as money, the term "price of gold" always bothers me. In this function, gold is the standard and provides the units in which other forms of money--currencies and the like--are defined

McL: and in which commodities are priced. One really should say what is the price of the dollar in gold rather than what is the price of gold in dollars.

The current official "price" of gold in dollars is really a fiction, for no one, not even a central bank, is willing to part with his gold for this price. Even the U.S. Treasury, which is obligated to redeem dollars held by foreign central banks in gold at the official rate isn't inclined to live up to the commitment. The current comment is that even though the redemption of dollars in gold by the United States is a de jure right, it isn't any longer so in a de facto sense.*

However, it is hard to get away from the term "price" of gold, for it is so commonly used. **

N: Is the price, then an arbitrary figure, or how does one determine what is should be?

McL: There are certain arbitrary elements in the price of gold, and the most arbitrary is the government's fixing of a price in terms of its currency. When the United States Treasury and certain central banks were trying to prevent the price of gold from rising by selling gold on the London market at the monetary rate of $35 per ounce, the price was held at this level until the drain on the monetary stocks of gold became alarming. Our gold was just pouring out like blood from a wound.

They said the speculators were buying. I would say the real speculator was the United States Treasury that parted with several billions of our gold in a misguided effort to hold the market price down.

After this practice was stopped in March 1968 the price went up and those speculators who sold then made a beautiful killing, and now treasury officials say,"We've demonstrated that speculators lose,

---

*Since August 15, 1971, even the de jure right has been repudiated. At that time our government virtually admitted it was bankrupt and couldn't meet its obligation in gold as it had pledged to do.

**Now, November 1973, with our gold reserves down to $9.5 billion at $35 per ounce and dollar claims in foreign hands over $80 billion, it would require a three or even fourfold devaluation of the dollar (to $105 to $140 per ounce) to make it possible to reestablish convertibility of dollars and other depreciated currencies into gold. At that, a settlement in gold of the debts of a bankrupt nation for twenty-five cents on the dollar would be better than complete repudiation.)

McL: because we've forced the price back to $35." Well, the speculators that rode up won; and the Treasury lost our gold.

Of course there are other speculators who may have bought at the top and have lost in the meantime--at least if they sold recently--but there will always be people who are naturally worried about inflation and the loss of their wealth that's in pensions, in insurance, and so on--particularly Frenchmen and Germans, who have gone through the mill--and we're going dangerously close to it ourselves. Such worried people--and they include many small people--who want to protect themselves, would buy gold as one of the easiest ways--at least if they were allowed to. Of course they're called "hoarders," but I would define a hoarder as a careful man trying to protect himself from the dishonesty of governments.

N: Was what you have just described the situation when, under De Gaulle, France was requesting gold? Is that part of what happened?

McL: Yes. There was a period when France was financially very strong. Our deficit in the balance of payments was serious, and France was in a strong position. They were reluctant to increase their holdings of dollars, and they were, I think, becoming more and more inclined to demand gold for the dollars they held.

Then troubles in France occurred--the student riots and labor unrest--which upset the whole French economy and resulted in a lot of worry about the value of the franc and a serious loss of gold. So they weren't in the driver's seat any more.

It wrecked De Gaulle. He was advocating a return to the gold standard, though he did not come out--as I think he should have--and advocate a revaluation of gold. Jacques Rueff, who was certainly one of his close advisers, favored an increase in the official price of gold. There I am using that term "price" again. It's hard to avoid. What one really should say is that the value of the currencies in terms of gold should be reduced.

In January, 1967 there was a conference in Bologna on money and gold that Jacques Rueff attended. Where's my volume on that meeting? Here it is. That is Jacques Rueff's picture on the cover. I think he is a bit sad and disillusioned at the way some things have gone.

N: This is his book, Monetary Reform and the Price of Gold, Johns Hopkins Press, 1967.

McL: Yes. There were learned arguments on both sides at the conference. I was the co-chairman with Willard L. Thorp. Some of them--particularly the sponsors--seemed to want somebody who was not an economist to

McL: be co-chairman. [Laughter] Jacques Rueff was the principal spokesman for gold. Triffin, Bernstein and Emminger were the chrysophobes.

N: You were co-chairman of it. I would like to look more at this if I may. Is it possible for one nation to determine to go back to the gold standard, or is this something that the whole world's economy has to agree upon?

McL: I think it would have to be done, if it were to be in an orderly way at all, by the whole world. All the currencies of the world have been decreasing in value in terms of their purchasing power. Every now and then, through excesses of one sort or another, one gets too far out of balance with the others, and is devalued.

Each country generally tries to get out of difficulties by gaining certain advantages in trade by devaluation. England has had several, France has had several. It was assumed that the dollar was tied firmly to gold and that when it became weak, other currencies would have to be adjusted upward--revalued was the term used. The Germans have had such a revaluation. That is, the mark has increased in value in relation to the dollar. We way that that is writing the mark up, but it is writing the dollar down in terms of the mark. It is a devaluation of the dollar in terms of a stronger currency, the mark.

It seems to be infra dig to recognize the fact that the dollar, which we pretend is the world's standard, is devalued. But strangely enough, holding the dollar to gold, with the mark going up, is an a attempt to devalue gold in terms of a paper currency, the mark. And I just don't think it can go on indefinitely. Sooner or later it will break the official tie of the dollar to gold. It is already broken de facto though not yet de jure.

The Discipline of Gold

N: If we were all on the gold standard, would this kind of devaluation and revaluation of one currency with respect to another, still go on?

McL: If we were on the gold standard, the "discipline of gold" would slowly have an influence, and check the excesses in which our country and others are indulging that lead to inflation.

N: When you say the "discipline of gold" you are referring to...

McL: Convertibility of a currency into gold at an official rate and the

McL: requirement to meet deficits in international payments by settlement in gold. Under the old gold standard, when a country lost gold, its currency adjusted more or less automatically in its exchange rate--the free exchange rate--to another currency.

N: If there is need for big industrial development within a country does that make the gold standard less advantageous for that country? I'm thinking of African and Asian countries that need very great industrial development. What sort of effect would a gold standard have on their development?

McL: I think that in those cases those countries, if they were handling their political affairs and their legal affairs in ways that inspired confidence, would have no difficulty in having money provided from the strong, capitalistic countries.

For example, big enterprises like the Cerro de Pasco enterprise in Peru, or the Chile Copper Company in Chile--immense companies--were developed in the days of the gold standard. The money was invested with a great deal of assurance that there would be stable exchange rates.

When I went to Peru first, Peru was on the gold standard. I still have a little coin called the Peruvian pound, "una libra de oro," which was like the British gold sovereign and had practically the same exchange value. We all had those sovereigns in our pockets, and we could exchange Peruvian currency for the gold at that price.

The Peruvian currency and the American currency stayed close to par all those years, which made life a lot easier for a developing country like Peru than it is today when the Peruvian currency keeps depreciating and depreciating 'til you don't know what it's going to be.

You have labor turmoil; labor trying to push its wages up in terms of Peruvian currency, and the currency buying less and less. It's a most disturbing condition. I think a stable money, which you can have probably only under a gold standard, is far more beneficial to these developing countries than persistant inflation which surely contributes to their present turmoil.

The shocking way that the Brazilian currency is just going and going--who would want to make a long term investment in it under those circumstances? Well, I think anything that gives the world a stable money and reduces the fluctuations in exchange rates promotes the whole world economy, and particularly the world economy of the developing countries.

Even though when I argue about gold, it sounds as if I'm just

McL: arguing for the special interests of the Homestake Mining Company, I'm absolutely convinced that the things I have been advocating for so long would be good for the whole economy, not only of our own country, but for the whole world. But I don't seem to convince many people.

N: You never quite know what seeds you plant in people's minds. Perhaps when the right time comes you'll get a response.

McL: Well, just at present I think a substantial revaluation of gold is the one way out that the Nixon administration has, if inflation is to be checked without creating Depression that could wreck Nixon as badly as the Depression of 1930-1931 wrecked Hoover.

N: Is there anyone in the administration now who shares these views?

McL: I doubt it. Perhaps Arthur Burns does to a slight degree. He's of course chairman of the Federal Reserve now. I'm sure he doesn't share these views that I've been expressing in toto, but he has said that a revaluation of gold and an increase in the price of gold would not be the worst solution! [Laughter] Or words like that.

N: A little chilly comfort. If such a development were to take place world-wide, would the non-capitalist countries be able to share in the same decisions?

McL: I should think they would. The smaller countries do not have great reserves of gold. Oh, you mean the socialistic countries?

N: Yes. I was thinking of China, or Russia.

McL: Of course there is the wall around them. Their economy is really walled off. The Russians, apparently, are attaching great value to gold, because while we have very little accurate information about their production, we know that they're developing large gold mines. They're the second producer of gold after South Africa, and for the last three years the Russians have not been selling gold.

Before that I think probably in relation to the failure of the wheat crop and their need for exchange, they were selling $200 million or more of gold per year on the market to get foreign exchange. The Russians have not been selling any gold for quite a while, which indicates that they prize their gold; that they regard what they could get for the gold as too little and they'd rather keep it.

N: Do they participate in the International Monetary Fund?

McL: No, they don't. Of course they're not on anything that you could call a gold standard, but they are hoarding--holding--their gold. How much it costs them to produce gold, we don't know, because their bookkeeping

McL: is very different from ours.

N: So there are no comparable figures?

McL: No. We just don't know. Some people say it's costing them the equivalent of $70 or $100 an ounce in our terms to produce gold.

N: And what does it cost us?

McL: Well, that depends upon the mine.

N: Homestake?

McL: Homestake--the cost is getting uncomfortably high. It's now close to $35 an ounce, that it's costing us, which leaves rather a small amount for profits. On the other hand, the reason it's costing us that much is the mine's very deep, and you just have to spend money to get gold out from hard rock down five and six thousand feet in the earth where the rock temperature's one hundred twenty degrees or more.

There have been a couple of new mines, very good mines, developed in Nevada, which are open-pit mines. The Newmont Mining Company has a mine at Carlin, Nevada--near Carlin, which is producing gold for a relatively low price because it's simply mined by power shovels in an open pit.

N: Is it very low grade?

McL: No. It's pretty good grade, too. It's not as large a production as ours, by any means, but it's the third producer now in the country. The second producer is the gold that comes out as a by-product from the great copper pit at Bingham Canyon of the Kennecott Copper Corporation. They mine enormous tonnages per day, and though the gold content is relatively small, it's very significant in the aggregate.

The price per ounce of gold will depend a great deal upon the nature of the mine. There's probably still gold ore left in the Mother Lode in California, but it would be extremely costly to mine. Those mines are all shut down.

In South Africa, in the Rand and in the Orange Free State, the older mines are shutting down or about breaking even. Some of the newer mines where the ore is much higher grade are making very good profits at the present price.

At the present price the production of gold in South Africa is leveling off and probably will start down in quantity of gold per year. Even an increase in the price would cause a decline in annual production,

McL: for lower grade ore would be mined, and until plant capacity was enlarged the output of gold would decline. But the life of the mines would be lengthened. And on this continent I think continuing inflation is going to cut the production, without doubt. With gold sold for paper dollars at the official rate, it would have been only a few years before a mine like Homestake would be shut down. Fortunately, the market price of gold is already higher but it will have to take a big jump to match the rise in costs due to inflation. But I am sure that's going to happen.

N: As you have explained so clearly, if the price of gold, became, let's say, $70, then you would have much more leeway in your production costs?

McL: Oh, yes. If the price of gold went to $70, the value of our production would be $40 million a year instead of $20 million. We would have to pay higher wages; all labor costs would go up, taxes would go up, so we wouldn't get all that profit, but we would do very well for a while. Those would be nice problems to have to face, but it wouldn't be, by any means, all profit.

N: As a geologist, is it your opinion that there are still undiscovered gold deposits available in the world?

McL: I'm sure that more gold deposits will be discovered, but they will be more difficult to find. I think the chance of the discovery of another California, where there was coarse gold in the streams, that a prospector could go in and easily find, is pretty remote, though there may be such deposits still hidden in some parts of the world. I think the future deposits will be deposits that can be found only by much more subtle methods of prospecting, much more costly methods of prospecting, and possibly deposits in which the gold isn't as clearly revealed as it is when you find nuggets in a stream.

The Crest of the Spanish Tide and the Supply of Gold

McL: I think one of the strange, extraordinary, almost ironic things in history is the way the Spanish tide came up to its crest in California and then lost its energy and didn't reach across the Sacramento Valley to the greatest treasure of easily recovered gold that existed in the world.

The early Spanish in California, bold and energetic explorers as they were, missed it by 50 miles. They were here in 1776 in San Francisco. They reached the Central Valley and undoubtedly saw the Sierra Nevada range, the snowy range, to the east. They even named it. But they didn't explore even the foothills. The Spaniards apparently didn't really go to the other side of the valley at all, and they missed that great treasure.

McL: It might have changed the course of our history if they'd found it. They were so avid for gold, and they did so well in Mexico and then Peru. Coronado made his great expedition which found no gold, but I am sure he was looking for it. When they came up here, their energy seemed to run out, just before they reached the country where the gold was.

The discovery of gold in California occurred, just a week or so before the Treaty of Guadalupe Hidalgo was signed. Think how narrowly they missed this immense treasure of, you might say, poor man's gold, because anybody could go in with a pan and wash gold out of the streams.

N: Is there much silver in California?

McL: No. There is more gold--probably little remains that could be mined at a profit at the present price. At $70 an ounce there would probably be a revival of exploration for gold that might lead eventually to more production but it would be a small hump on a descending curve, I think.

N: Thinking then just of the gold sources that are known now, including the South African, does it seem to you that there is enough gold for industrial purposes and for monetary purposes for the foreseeable future?

McL: I'm sure there would be for ten or twenty years, until the next war--you can't predict longer than that. That's long enough for me, anyway! [Laughter]

I think that gold would serve its purpose if it is priced right. If the production of gold went down and gold became more and more valuable, a revaluation of the stock of gold in relation to the currencies could be made at intervals. I think every time you have a great war, or every time you have a great disaster, all concepts of money are disregarded. You pay for wars through inflation, which means confiscation of the value of insurance and the wealth in bonds and so on; but after such a war depreciated currencies have to be readjusted in terms of gold.

If gold became really very scarce, and there was a declining production and we were depending on the great stocks of gold that are in the great banks and hoards of the world, you could simply revalue those stocks by five or six times, and then go on with that same concept, until you reached the next disaster, the next war.

N: So your theories apply equally well almost regardless of the actual quantity.

McL: I think so, regardless of the actual quantity. There's probably about $44 billion at the present official price of gold in the monetary stocks

McL: of the world today. One reason why I think gold does serve as the commodity base is that even the great mines of the world can't flood the world with that type of money. South Africa can turn out a billion dollars of gold annually, but that's a small percentage of the gold that's already in the monetary stocks, and the quantity of the new gold that's going into the monetary stocks now is really very small. If the price were very much higher I think more would go into the monetary stocks and less into hoarding and less into industrial uses.

Hoarding: Three Categories

N: When you say "hoarding," how do you define it?

McL: I usually divide this sort of demand for gold into three categories. One would be speculation, one would be hoarding, and one would be investment. It just depends upon your prejudices which way you define it.

I would say a speculator is a fellow who will buy gold on a Thursday and expect a valuation that weekend, and who expects to sell it at a profit the next week. There are always people who are going to play rumors like that. Those are the real speculators.

I think the hoarders are people who really distrust paper money and feel that they want a certain amount of their wealth in gold. The French certainly do. There's undoubtedly a vast amount of gold held by individuals in France who are terribly afraid of the depreciation of their currency. A family patrimony in gold seems to be traditional. I think that's true in all Europe, and it's true of the oil sheikhs in the Near East. They want gold, and they hold gold, because they don't trust paper money.

They have this enormous income coming in from the oil, and what do they hold it in? Paper dollars? Or paper pounds or francs? All currencies with no gold backing are depreciating. They naturally don't trust those paper currencies, and I don't blame them. So they take gold. And the Oriental people want gold. There's also been a great flow of gold--smuggling gold--into India.

You can also say there are people who want to buy gold as part of their estate. If you want to make use of a more respectable term, you'll say they're investors. But we can't--the American citizen cannot legally buy gold bullion or coins minted later than 1934. He can't be an investor in gold, except to hold jewelry, old coins, or gold in the ground.

Strangely enough our treasury boys and our money-managers say,

McL: "Gold is of no importance any longer, we don't need any more gold in the monetary system." But they insist that "the price of gold in dollars" is so critical that our citizens must not buy and sell it or even own it. It doesn't quite make sense.

I told a secretary of the treasury once that in this case he should agree that the restrictions on ownership of gold should be removed, since they regard the gold as of so little importance. He said, "I think you have a very good argument, but it isn't going to happen!" [Laughter]

We've got off on something that I didn't intend to talk about at all this morning, and you probably didn't intend to ask me questions about it.

N: I wanted very much to do this. Professor Meyers tipped me off--he said I must be sure to ask you about this, that you were an authority on gold and that you had many interesting ideas about it, so let's go on with it as long as you like.

McL: I'm afraid I can't claim to be an authority. I think the value or worth of gold arises from three causes: its use in industry, the arts and dentistry; its acquisition for speculation, investment or hoarding; and its worldwide acceptance as money. All three create a persistent demand for gold. None of these demands is likely to disappear. They will always be present. I'm certain that gold is not going to be taken out of the monetary system. The gold in monetary reserves has a value of $44 billion at the current official rate for the dollar.

The Europeans control more of it than we do, and they are not going to demonetize gold, in spite of the rather glib remarks that are made in this country about gold having seen its day, and that it's becoming an anachronism.

Gold as a Commodity Base for Money

N: I wanted to ask you whether there is consideration of monetizing any other metal, silver, for example?

McL: I don't think so. The old days of free silver, of monetizing silver, have definitely passed. Why try to have two commodities that change in value with respect to each other? I think if you're going to have a commodity base for money, it has to be one thing, and gold by tradition, by its physical qualities, and its claims on people's imaginations is obviously the right one.

Platinum is too scarce, and the industrial need for platinum is large and growing. For example, platinum is an indispensible catalyst in oil refining. The most promising device for removing the fumes from

McL: the exhaust of gasoline cars contains platinum and such a use would create an immense new demand. Fortunately, there are large reserves of low grade ore in South Africa that could be mined on a much larger scale if the price were high enough.

Furthermore, platinum is a far less beautiful metal than gold and hasn't the same psychological and traditional hold on all manner of men that gold has.

I think gold is the one commodity that in a very real sense gives the world a common money, and as such it reaches even into the socialistic countries--into Russia and into China. If the world is ever going to have a common money, it seems to me the only basis for it today would be gold. Certainly the world is not going to accept the dollar as their common money. De Gaulle wouldn't, but I'm sure the rest of the Europeans wouldn't either, in the final analysis.

The reason the dollar was for a time very nearly the world's common money was that it could be redeemed in gold--at least by central banks--and now we've abused the dollar to such an extent that the claims in dollars against our gold are pretty nearly four times the quantity of gold we have. It is no longer considered to be a good as gold. Naturally the Europeans are a bit skeptical about our ability to redeem the dollar in gold. I think the dollar is losing its prestige and status as the world money. It hasn't gone completely yet, but it's on its way.

So I think the one thing that could be a common money is gold, and I don't see why the people who are really competent, knowledgeable people about money don't utilize gold effectively.

N: In your view, what is the strongest argument that they put forward for not using gold as the basic money?

McL: One argument has been--and you brought it up a little while back, that there isn't enough gold to go around. Well there isn't, at $35 an ounce. Whether there would be at $70 is perhaps doubtful, but I don't think so. I think $70 would pull gold out of hoards, and I think we'd have another two or three decades when we could have quite a stabilized sound money with gold at $70 an ounce. There are some people who argue that it would have to be valued much higher than $70, but I think that if inflation could be checked at the present level $70 would hold, because that would insure not only a good flow from the mines, but a flow out of hoards. If the paper dollar continues to depreciate, however, gold would have to be higher in relation to it.

N: Do I interpret this correctly: that you feel that hoards are basically non-productive and it's a good thing to decrease hoards?

McL: I think in a sense they're basically non-productive, except to the extent that a hoard can protect a man's wealth. For example, the Frenchman in 1914 who had a nice, comfortable pension with some insurance and an adequate income for his old age might have felt pretty comfortable with his 1914 francs. But what are they worth now? A fraction of a cent. If he'd taken those francs and bought gold with them, say, in the spring of 1914, and buried it in the garden, he would have preserved his wealth.

N: Can you spend little pieces of gold now? Are gold pieces exchangeable?

McL: The Frenchman can. It's legal. He now can dig up his gold and spend it. An extraordinary thing today is the great difference in value of gold coins over gold bullion. You now can own some of our gold coins, like the $20 gold piece and $10 gold piece, and those, because they're regarded as collector's items. No more are being made. But you go out and try to buy them! You'll be paying quite considerably over $70 an ounce. Even silver--there are practically no silver dollar coins available for less than around $3, if you try to buy any of them on the market. Shows how Gresham's Law works.

Every day there's a quotation for various coins in European markets, and the price of gold in those coins is practically always much higher than the price of gold in bullion. I wish we could strike medallions and pay our dividends. I'd even put Roosevelt's head on one with a halo--and call it a redeemer. [Laughter]

N: Coming out of Homestake that would really be elegant, wouldn't it?

McL: That would be illegal. [Laughter] In fact we can't even put out commemorative medallions, though we might be able to get permission to do that. That would be rather nice.

N: With Arthur Burns on the other side, you might.

McL: Well, he doesn't have the say. I don't think the Federal Reserve Bank would get into that problem. That's up to the treasury; we really operate under the treasury regulations, based on the laws of '34 and '35.

N: Does there seem to be in prospect any change in the laws?

McL: I see very little chance. We would like to have the restrictions on ownership of gold removed, and I think we make a perfectly good, logical argument for that, in which case the American citizen would have the right to buy and hold gold if he wanted to, besides owning it in jewelry. If you go into Tiffany's and buy a gold necklace, you'll find you're paying a price for gold 'way, 'way above $70 an ounce. Of course they say that's the workmanship. Nevertheless, it's a terrifically high price.

Fiat Money

N: When you speak of gold as a commodity base for a monetary system, is the alternative fiat money?

McL: Yes, and by fiat money I mean that it is money by the authority of the government. For example, if I owe you $100, and I give you a $100 bill, I have legally paid my debt, whether you want to accept it or not--I offer it to you and you don't accept it--I've paid my debt. If you won't take it, I wouldn't be legally held responsible. If you remember, the fine print on the bills used to recite that they were "redeemable in lawful money," at any reserve bank or the treasury. Now lawful money, under the Constitution, is gold and silver, but the treasury would only give you another dollar bill if you tried to redeem it. This has been done without anybody's noticing it. Now they've taken off that statement, "redeemable in lawful money." The new statement reads, "This is legal tender in payment of all debts, public or private." Now, that is what is meant by "fiat money."

N: You were saying that gold or silver is defined as lawful money in the Constitution?

McL: That is what the old statement must have referred to. There are still a few bills in circulation that carry it. The last one I saw was a $10 bill.

N: Let's see if I have one, just for fun.

McL: I kept one, the last one I found (paper crackling). But I don't seem to have it.

N: No, this says, "This note is legal tender for all debts public and private."

McL: You'll find very few of the old bills in circulation, the bills of five or six years ago. The statement on them that it was "redeemable in lawful money" was getting embarrassing.

N: So the difference is between "lawful money" and "legal tender."

McL: It's a very definite distinction. Some suits were brought to demand payment in "lawful money" but they've always been dismissed, one way or the other.

N: Does being on the gold standard or not being on the gold standard have any effect on stock market performance? That is, the fluctuation that we are seeing now?

McL: Being on a gold standard and controlling inflation would, I think, restrain

McL: some of the excesses; I don't think it would eliminate them. Even with the gold standard, as some wise banker said the other day, "A monetary system is only as good as the people who are running it." Under a gold standard, abuses could grow up, and if those abuses became severe, either the power of the gold standard itself would correct the abuses or the gold standard would be thrown overboard, just the way it was in the big Depression and the way England had to do after the wars.

Gold Standard and Other Controls

N: You have given us a good statement of the virtues of the gold standard; would you be willing to give the other side? That is, the possible misuses of the gold standard?

McL: I think that's a side I probably don't dwell upon very much. [Laughter] But if you had a period of great depression, unemployment and a time when a government wanted to spend money very freely--and probably should--strict adherence to the gold standard could cause or prolong hardships. If it was a major disaster, such as a major war or the Depression of the thirties there might have to be a drastic devaluation of the dollar and other currencies in terms of gold with convertibility in gold reestablished at the new rate, if the difficulties were to be relieved and some measure of discipline maintained over the money managers.

N: Wage and price controls, that sort of thing?

McL: No. I would trust the market. Wages would be stabilized and prices would be steady, if the deficits and excessive increases in the money supply resulting from their financing were ended. I think you could imagine a prosperous economy if wages and prices both went down together: a deflationary instead of in inflationary economy. That is, in the decades following the Civil War certainly there was great expansion and prosperity in the United States, and by and large it was a period of falling prices. We somehow or other seem to tie rising prices and prosperity together, which doesn't make sense. Yet that's the way everybody thinks.

I think you could have falling prices and wages and prosperity also. But I don't think it's likely to happen now.

N: So it's the relationship among prices and wages?

McL: Yes. I think in all these things that there are so many variables. Wages go up, prices go up or wages go down, prices go down, but they don't move evenly. Some one or the other of the social groups gets great benefits at the expense of another.

N: Is it possible to get a better meshing wihout controlling the economy rather closely?

McL: I don't see how they can do it. I really am getting more and more skeptical about the ability of these theorists among economists and bankers who think they can really fine-tune the economy. There's such wide divergence of opinion--one group gets in the saddle and they all go in one direction, another group gets in and goes in another direction. I just don't think they have the ability to give proper weighting to each of the multitude of variables that must be taken into account, and particularly the factors that vary with social and political emotions.

N: How would you characterize the present policy?

McL: The present policy, as I see it, is temporarily dominated by the thought that if interest rates are high, the economy will be slowed down a bit, and there will be less expenditure for new plants and things of that sort, which will check the inflationary tendencies, and prices will level off or even decline. If really carried out consistently, it would probably start a depression, and at the first signs of that, such a policy would be reversed. It might be the traditional way to control an inflation, but I doubt if any politician could survive it.

Well, that's a theory, but it isn't working out in practice. I think there may be some fundamental fallacies in it. If growth in the gross national product is slowed down, there are less goods, and if people are still sitting with more money to buy them--provided by deficit financing--prices will tend to go up.

N: Isn't it difficult to pursue this concept while there is a war?

McL: In a war, all bets are off. Well, of course, in a war like Vietnam--that's another story. Our national existence isn't threatened, but in a war where your national existence is threatened and you are faced with the possibility of defeat, all rules are off, and under those circumstances the dominant government simply finances it with paper money. You've got to take it. Of course, during such a war, you can have price controls and wage controls that the people will accept and temporarily such measures will hold prices down. Well, during the war you couldn't buy whatever you wanted, you may remember. Things were not on the market, so in that time the people who were getting pretty good wages were putting a lot of money into savings accounts. Paper money was accumulating and it eventually produced a great flood of buying power when the controls were removed. All that buying power came out and up went prices.

You'll pay in the end with severe inflation. I really think that after every great disaster, such as the World War, you'll have to have a revision of the currencies--a reduction in the gold content of the currencies--if they're going to still stay on gold and remain convertible into gold.

McL: In other words there would have to be an increase in the price of gold in relation to the depreciated currencies, or a revaluation of gold in terms of those currencies if you're going to try to get back into a proper equilibrium. If you attempt to hold gold at the old price, everybody would prefer to have gold rather than paper. Then--of course we don't allow people to have gold--but there'd be a great rush to it if we did.

N: There certainly would!

Gold Dredging in Alaska

N: Thinking of some of the areas of the world in which you have done some geological work, is there gold still in Alaska that is profitable to mine at the present price?

McL: There are very few known deposits that would be profitable to mine in Alaska, unless the price is substantially higher than it now is. The last profitable production came from gold dredging operations, where detrital gold in great gravel deposits is mined by dredges that float on artificial ponds and dig out a bank on one side, wash the gravel, recover the gold and dump the barren gravel. The dredge moves right along, eating up the gravels in a valley. You can mine and make money out of very low-grade deposits that way. For a long time there've been no really important discoveries of new gold deposits in Alaska, but it's a tremendous area, and I think there's a good chance that there probably will be new discoveries there.

There's been very little prospecting for gold because everybody's been so pessimistic about making any money out of it, and the rate of development of new mines in Canada has been very slow also. I'm sure there will be more mines found in that great expanse of pre-Cambrian rocks in the north woods of Canada, but it takes enthusiastic prospectors. There's not much enthusiasm for prospecting for gold right now.

Large-Scale Prospecting

N: Do you think the day of the amateur prospector is passed?

McL: Not entirely, but pretty largely. Prospecting today has to be highly organized. There's geological mapping to be done, and then there's geophysical work--that consists of measuring magnetic, electrical or gravity anomalies and hoping that they will reveal places where ore exists that can be tested by drilling. These are promising techniques. No one of them leads right to the target, but when all are combined they may indicate areas that are more favorable for ore than others.

McL: Such observations are generally first made from airplanes and then followed up by similar work on the ground. Finally, places are selected for more costly testing by diamond drilling. Those techniques don't work as well for gold as they do for more massive sulphide bodies of metals such as copper and nickel. You have to use them rather indirectly in the search for gold deposits.

Other minerals that are associated with gold may be detected and lead you to the right places, but gold itself is such a small component of the ore that it isn't revealed directly by those techniques. You may get enough evidence to say, "Well, this is a good country to drill." These techniques work much better in connection with bulky ore bodies that are magnetic or are good electrical conductors such as some iron ores and massive sulphide ores of copper and nickel.

Many traverses are made by flying, with electrical and magnetic equipment, to register what we call the anomalies in the earth--the variations from normal in the earth's magnetic fields and the variations in the electrical fields that indicate changes in conductivity of the rocks, possibly resulting from presence of ores. The big companies are spending millions in work of this type. It's not a small man's job.

In Canada in the last few years, from flying followed up by ground work, a number of very important deposits have been found--one by the Texas Gulf Sulphur, a big mine of lead, zinc and some copper, silver--that is now in production. The International Nickel Company about 15 years ago found and subsequently developed a new great district in Manitoba, by what was really a combination of geophysical and ground geology followed by diamond drilling. Of course it cost millions to carry it through to success.

N: Is International Nickel one that you are still associated with?

McL: I've been elected again for another two years on the board. That makes me one of the oldest members on the board.

N: That's tremendously complimentary.

McL: It was. I was very flattered. They've asked me to continue to act as their consulting geologist, so I've been having a lovely time. I shouldn't be doing that, in my own position, but I can't resist it! [Laughter]

N: You've spoken a couple of times of diamond drilling. Is this taking a core sample?

McL: Yes. The diamond drill is an old tool, but it's gradually becoming perfected more and more. It's essentially a ring--an annular ring set with either diamond dust or small diamonds, with an engine to rotate it and to bore into the earth with it. Just on account of its hardness, it cuts a ring into the rock. The core goes up inside a barrel, and when the rods are

McL: pulled out, the core is recovered and available for study and assaying for its metal content.

N: Can you go to a considerable depth with that?

McL: Yes. Of course the deeper you go, the more expensive it becomes, but there are holes in the Rand that go down six to eight--maybe ten thousand feet.

N: Is this Witwatersrand?

McL: Yes. It's the Witwatersrand in the Transvaal in South Africa. We use the diamond drill at Homestake right along. Many, many holes are drilled--really hundreds of holes--in the mine as successive levels are developed. We usually explore by driving a drift, a horizontal tunnel-like opening, to the vicinity of the ore bodies and then drilling numerous horizontal holes that penetrate the rock for distances of 100 feet to 1,000 feet or more.

N: And then when the core comes out, exactly what.....

McL: The geologists determine the rocks and formations from the cores and use the information to map the geologic structures. Of course when mineralization is encountered the core is always assayed, in our case for gold. Then that's all plotted on maps. We're completely confident about those cores and those assays--it's a very precise technique.

Metals in the Sea

N: Is there any move toward taking such core samples or prospecting for gold undersea?

McL: Well, not much for gold so far. There's been some amazing coring done on the floor of the ocean, but mostly, so far, largely for scientific purposes.

About the only chance for gold would be where you have gold accumulated in beaches that have now been submerged by a rise in the sea. You see, gold tends to accumulate in the washed sands of a beach, just the way gold tends to accumulate in the gravel of a river. It's so indestructible, and it's so heavy, that with constant washing of the waves and with constant washing of the current of a river, gold accumulates along the bottom of a river as it did in California. That was the poor man's gold I referred to.

Or, sometimes where a river, carrying gold in its gravel, hits the seas, the gold will be concentrated by the washing of the waves and distributed along beaches. There was rich gold, for example, on the beaches

McL: at Nome, Alaska. That led to that great Nome rush. The U.S. Geological Survey has spent some money recently on studying the possibilities of a submerged beach off that coast. If there is, it would be a difficult job to mine it under the conditions that prevail there.

It's rather a strange thing that while the treasury was saying, "Oh, we have so much gold we don't need more," another arm of the government is spending tens of millions trying to find more gold! [Laughter]

N: Very curious.

McL: It is curious.

But there's the possibility of resources of metals on the floor of the ocean in nodules--in peculiar chunks of materials, still very hard to explain. Some contain manganese, some of them contain phosphates. There are even some that have nickel, and quite a number of other rare elements, but for the most part, those have been right on the sea floor itself.

N: Are they lumps?

McL: Just lumps, yes. Sometimes tiny pellets, or sometimes lumps perhaps a couple of feet in larger dimensions, but whether or not they might be recovered profitably is still uncertain. On the other hand, if you look at the long-range future, when the resources of the land are depleted, it's highly probable that devices will be developed for scraping such nodules off the bottom of the sea and recovering the metal from them. There are areas where they are very abundant but usually at very great depths. The technical and legal problems too are being actively studied by a number of companies these days.

N: Are the nodules volcanic in origin?

McL: No, it's really in some ways, I'm sure, a segregation from the seawater. The sea water contains everything, really, all the detritus that's washed from the land, and in solution in the rivers gets into the sea.

Of course, there is all this nonsense today about pollution. There's been degradation of the continents throughout geologic time and the sea is the residual place where all the elements collect. You can probably find all the atoms of the periodic table in the ocean. There's gold in the ocean, but in such dilution you can't recover it profitably--as yet, at least. Magnesium is about the only metal that's really being recovered from the seawater today at a profit.

N: There's so much about mining that I want to ask you, but I don't want to leave the monetary problems until you've had a chance to say what's on your mind.

Gold Coinage

McL: That's where I'm not an expert at all. I would just end up by saying that I do think that gold is the best hope to have a common stable money for the world if gold were properly used as the basis for the world-wide monetary system. I would like to see coins created again, because coins have a great hold on men's imaginations and they're beautiful. Throughout history they have preserved their value and provided a means of storing wealth that's awfully important in times of trouble.

Perhaps people may not want to go around with a pocketful of heavy gold coins, but they ought to have the right to. If you can get gold coins for your paper money at any time you'll have much more confidence in that currency. So I'd like to see the well-tested old, gold-coinage monetary system re-established.

The South Africans are putting out a very interesting new coin called the "Kruger Rand." Kruger after the old president Kruger. Their monetary unit is called the rand. It's equivalent to $1.40 at the present rate of exchange. The Kruger Rand, however, is a one-ounce coin--about the size of our $20 gold piece--guaranteed to contain one ounce of gold, but with no specification in terms of monetary units.

N: Now, when you say "no specification in monetary units..."

McL: It's not specified as so many rands or it's not specified as so many dollars. It's as if we created a coin here about the size of the $20 gold piece and just labeled it "one ounce of gold." So these are labeled "one ounce of gold," and their value, of course, for the time being, would depend upon the so-called "free market" for gold.

N: At the moment do you know what it's equivalent would be?

McL: They sell it at eight percent over the "free market,"--I don't like to use the term "free market"--over the available market price. They're selling in very substantial quantities.

N: Is it legal for an American citizen to own a Kruger Rand?

McL: I don't think so. I don't think we could buy them, for none were minted before 1934, which in some strange way changes the legal status of the gold.

N: I see. Now when it says, "This has one ounce of gold," what other metal does it contain?

McL: Pure gold is too soft to use in coins, so monetary gold is usually about ninety percent gold, and ten percent copper, which produces an alloy with the desired hardness. The copper-gold alloy is the common coinage alloy.

McL: The copper-gold alloy is the common coinage alloy, is relatively hard, and still preserves the beautiful lustre of gold.

N: In addition to this South African Kruger Rand, are other nations creating gold coins in the same fashion?

McL: I don't think so. Some Italian goldsmiths a few years ago put out a lot of gold sovereigns. Of course there was a suit brought against them. They claimed that the sovereigns they put out were legal and honest in that they had the full amount of gold in them, but I don't know just what the outcome of that suit was. I wouldn't be a bit surprised if there were some of the old coins being reproduced; and if they have the honest amount of gold in them, is that counterfeiting?

N: Yes, what is counterfeiting, after all?

McL: Of course, from an artistic standpoint, from a collector's standpoint, you could say it was counterfeiting when the value perhaps depended upon the fact that it was an old coin. Let's say, take an extreme case, if you counterfeited a coin of the period of Alexander the Great, that coin could have immense value as a museum piece, and a reproduction of it might have the same value in gold, but if you couldn't tell them apart.... [laughter].

N: Well, this suggests all sorts of interesting illicit opportunities.

McL: Oh, it does. It really does. I've even heard of an ancient coin that carried the date 350 B.C. [Laughter]

Bullion and Nuggets

N: Now gold bullion is produced in little blocks, little bricks?

McL: Yes. Gold ingots, they're called. We have to put out bullion of a certain quality for the market. We have a refinery right at the mine. For years, we used a "chlorination process," that produced gold that was .997 fine (i.e., 99.7 percent pure gold) which was perfectly good for most jewelry purposes and many other uses. But the electronic industry wants it four nines fine (i.e., 99.99 percent gold) so we put in an electrolytic refinery and we can turn out the gold of this high purity for these purposes. So now we can give the market about anything it wants.

N: I see. Are these little blocks very heavy?

McL: Oh, yes. Gold's very heavy. The ingots we turn out contain 250 ounces of gold. That seems to be a size suitable for our market. The South African gold is usually in 400 ounce ingots. We sell the gold slabs directly to

McL: the consumer.

N: And about how much would that weigh--one of these bricks or slabs?

McL: Oh, let's see. Ours are about 250 ounces. The standard South African ones are about 400 ounces.

It's quite a sight to see the gold poured into the molds. We have turned out nearly 600,000 ounces of gold a year, though our production is considerably below that now; that would be six times thirty-five at the monetary price to get the value of it over $20 million at the offical rate (1971).

N: Yes. In the Pacific Northwest we saw the little lumps out of the streams--the little nuggets on watch chains, and things like that. That was my first knowledge of gold.

McL: The nuggets, oh yes. Lots of people love them.

N: They are odd little things.

McL: Yes. They're the fragments of gold, you see, that occurred in veins and in the solid rock, and as the mountains were worn down, they disintegrated with the rocks and accumulated in sands and gravels in the streams. Lumps of gold that were liberated from the veins were rolled and pounded, buffeted by the boulders and the gravels, until they were shaped into these little nuggets, or were abraded to fine little specks of gold--flour gold--tiny little grains of gold. That's the sort of thing you wash out of the sands and gravels, these tiny little specks and flakes of gold, and then, if you get a nugget, so much the better! You can say correctly that gold is so stable a metal that it survives even the destruction of the mountains themselves as they are worn down by erosion.

N: It's so nice and tangible.

Chamber of Mines of South Africa

N: There was a note that you were going to South Africa, Los Alamos, New York, and Paris, the last time we talked.

McL: Yes, I started at Los Alamos at a meeting of the Advisory Committee on the Plowshare Projects. I've been on that for quite a long time. That was a very pleasant and interesting meeting. Then I went on to South Africa. I was down there as a guest of The Chamber of Mines when that organization was celebrating its 85th Anniversary.

McL: The Chamber of Mines of South Africa is supported by practically all of the gold mining companies, and they perform a number of functions that would not be allowed in this country. For example, they make the contracts for the entire industry; they also receive all the gold from the mines and refine it. It's a very important organization.

It represents the interests of the entire mining industry more fully than any of our organizations such as the American Mining Congress could without running into trouble under our anti-trust laws.

N: It must be very powerful.

McL: It is powerful. They have their own building and a big staff, and they put on some very nice parties. I was invited down as an American guest to celebrate this anniversary with them and had a very nice time.

N: I see. So I take it then that the Chamber of Mines is recognized by the South African government.

McL: Oh yes. They're the spokesmen for the mining industry and can do many things that I don't think could be done here under our anti-trust laws.

N: It's interesting that you see all of these different methods of operation.

McL: Yes. Their set-up is really quite different in many ways. They can do many things we can't do.

N: Do they deal with, say, the International Monetary Fund, or is that done by the government?

McL: No. They refine the gold, and the gold goes to the Reserve Bank of South Africa, which is the official central bank, and the mining companies are paid for their gold in rands at the equivalent of the official price of $35 an ounce. The government of South Africa, or the Reserve Bank, has the exclusive right to dispose of that gold--either holding it in the monetary reserves or selling it on one of the worlds markets.

When they sell the gold on the market above $35 an ounce, then the additional revenues go to the mines. Of course the contribution of each mine to the refinery is very accurately known,so that when these sales are made the amount received over the official price goes to the mining companies in proportion to their contribution of gold. That is, it's additional to the base price they receive at once when their gold is delivered to the bank. They're guaranteed a floor that is equivalent to $35 per ounce. Now, today in our country, we are not. That is, Homestake has to sell its gold on the so-called free market, which means that we can sell our gold only to people who have contracts to buy specific quantities of gold for specific purposes under contracts from the treasury. But with consumption over four times the domestic production, our market is pretty safe. But if for some reason or other, which I think is very

McL: unlikely indeed, the market should go below the official price, well, that's just too bad as far as we're concerned.

N: Is there a ceiling on the price that you can charge?

McL: No. We sell on the daily quotation of buying and selling price by the Englehart Company.

A Second Look at Gold Policy

N: I noted in glancing over our other conversations that about nine months ago, we had been talking about gold and gold policy, and I wondered if you were interested, perhaps, in returning to it.

McL: Oh, yes. That's a continuing interest of mine. Gold and gold policy. After all, we still turn out gold. In the meantime, we have to sell our gold on the market. It's not an open market, it's a closed market, because we can sell only to the people with licenses to buy.

N: What is gold in the open market now?

McL: It's about $38 to $39.

N: That's interesting. When we talked nine months ago or so, it was around $35, wasn't it?

Conferences on Gold

N: You had mentioned that you're going to a good many conferences and meetings about gold. Let's see, you spoke of Bologna, Geneva, South Africa. Do these meetings all deal with gold policy?

McL: The one in Bologna and the one in Geneva were very definitely oriented toward gold and money. All the discussions were primarily concerned with monetary theory and the function of gold in relation to money. It was certainly discussed at great length at the Bologna conference. I hesitate to say it was a well-balanced group because the principal speakers were definitely slanted against gold, with the exception of Jacques Rueff of France. But the other leaders of the discussion, Ed Bernstein and Triffin Emminger, were certainly by no means enthusiasts for gold.

N: Did you say Peter Bernstein?

McL: No. No. Ed Bernstein. He was then with the International Monetary Fund.

McL: He's an economist of considerable note.

N: What was the group? Who called the meeting?

McL: It was a group that was really promoted in many ways by Philip Courtney who is an extraordinary, brilliant chap, about my age. He was head of Coty and Company. He's quite well off. He moved to New York when Hitler came into power and became a naturalized American citizen. Now he's living in Geneva. He has been passionately interested in the gold problem and related monetary problems for many years. He feels that a restoration of the discipline of gold in money is absolutely essential if we're going to prevent continued inflation and if we're going to stop the governments from deficit financing; running steady deficits which they meet by printing more paper money. This is what we're doing in this country, and he feels very strongly about it.

When the South Africans talk about gold and monetary problems, they are of course under the same suspicion that I am, for we appear to be promoting our own special interests if we advocate an increase in the price of gold. But the South Africans, I think, have been very broad-minded. They really supplied the money for these conferences and have by no means tried to restrict attendance to those who support our position.

N: Were these invitational?

McL: Yes, they were invitational. I think the Chamber was extremely generous in that they allowed the conferences to be set up without trying to influence who was going to be invited.

There have been three such conferences. The first was held in October 1965 at Tarrytown, New York under the sponsorship of the National Industrial Conferences Board. Then, a second was held at the Johns Hopkins University Center at Bologna University in January 1967.

The conference in Geneva, the later one in 1968, was set up deliberately as a group of presumably knowledgeable people who were in favor of gold, who were brought together to discuss the problems and to form some conclusions as to what, in their opinion as the advocates of gold, were the right steps and the best procedures. So that was definitely a pro-gold conference, but it certainly was not a conference without a lot of controversy.

Perhaps I should mention that the papers and discussions at the three conferences on gold and monetary problems appeared in the following publications: Gold and World Monetary Problems, Monetary Reform and the Price of Gold, On International Monetary Order - Agenda for Action by a Group of

McL: Monetary Experts.*

Apparently you can't put two or three economists or bankers together without controversy, even if they're of the same school.

N: These were primarily economists and bankers?

McL: Yes, these were practically all economists and bankers. In all three conferences there were some people from South Africa who like myself were gold miners but a couple of them had proper academic credentials. Jack Holloway, who had been a minister in South Africa and also Ambassador to the United States, was one of them, for he was a Ph.D. in economics. And one of the group was Dr. William Busschau, who had been manager of the Consolidated Gold Fields of South Africa, one of the world's great companies in gold; he also had an Oxford degree in economics. So he carried rather special weight. And then there were a couple of representatives from South Africa who were primarily mining people. I am sure I ranked simply as a mining man from the United States and certainly not as an economist.

N: The academic background ought to be recognized somewhere.

McL: It's the academic discipline that counts. An engineer didn't have the right union card. I presided over a good deal of the meeting in Geneva, which was rather fun, trying to keep things on the track. I was also a co-chairman at the Bologna conference.

The more recent meetings I've been going to were just big organizations like the Mont Pelerin Society in Munich. It was a group of rather a large size and I think has lost some of its original quality too.

N: Is there any attempt to bring in people from different countries?

McL: Yes, it's an international society. I'm not a member. I was just a guest at the Munich meeting in September 1970.

---

*Gold and World Monetary Problems, (New York: Macmillan, 1966) covering the Tarrytown Conference on October 6-10, 1965, and sponsored by the National Industrial Conference Board.

Monetary Reform and the Price of Gold, edited by Randall Hinshaw, (Baltimore: Johns Hopkins Press, 1967), covering the Bologna Conference, January 1967.

On International Monetary Order - Agenda for Action by a Group of Monetary Experts (Graduate Institute of International Studies, 1968), covering the conference at the Graduate Institute of International Studies in Geneva, April 18-20, 1968.

N: These earlier conferences, in Geneva and Bologna, were these also international?

McL: Oh, yes. English, French, Swiss, South Africans and Germans.

N: So it was essentially European and American.

McL: Yes, essentially European and American. There were no Russians, no Orientals.

N: No African nations. Well, South Africa.

McL: South Africa, yes. Oh, I don't think you'd find anybody in Black Africa who could really contribute to such a conference.

N: What sorts of aims do you feel the conferences have? What do they seek to accomplish?

McL: The small conferences really endeavored to promote thoughtful discussion of the problem and to present the views of qualified scholars through publications and through reports concerned with the place of gold in the monetary systems that would attract attention and perhaps improve the thinking in higher circles. I think, in many ways, they succeeded in doing that. Whether or not they had much impact, I don't know.

I'm afraid Jacques Rueff has just taken the position that the situation has deteriorated so far that no rational argument is going to have any effect. He fears that the outcome will be eventually forced by harsh circumstances rather than settled on the basis of careful and logical reasoning. We'll go on to worse and worse inflation until something really cracks. I'm afraid that's exactly what's going to happen. If some of his good advice had been followed five or ten years ago, I think a great deal of the current inflation and monetary turmoil could have been avoided.

N: Do you feel that a closer adherence to a gold standard concept would prevent this kind of trend?

McL: Yes, it would just be impossible to continue deficits and remain on a true gold standard. Deficit financing is much more difficult when the dollar is redeemable in gold, that is, when a citizen has the right to go to the bank and get gold for his paper money. The government or the central bank would have to prevent the currency from deteriorating so that people would be willing to hold it, and wouldn't lose confidence in it and demand gold.

However, I don't think changing the price of gold and going back on the gold standard would accomplish anything very effectively unless the people had the willpower and the governments had the desire to stop indulging in persistent deficits and financing them by expanding the money supply. Persistent spending in excess of income really is the basic cause of inflation. And if a country has become committed to spending more than it

McL: can raise in taxes, deficits and inflation become inevitable. A corporation or an individual would go bankrupt under such conditions, but a government directly or indirectly can create paper money and pay its bills with it--at least its domestic ones. When it has to meet foreign claims, however, persistent deficits get it into serious trouble, as we are beginning to find out. There are a lot of things coming home to roost.

In spite of all the talk about economy, expenditures go up and up faster than income. So I think Jacques Rueff is right. We will just have to wait for something drastic to bring the world to its senses. I don't know how it will come about. Depreciation of unredeemable currencies seems to be a worldwide phenomenon. I'm actually very pessimistic, which is not a very good thing to be.

N: That doesn't seem your nature, really. [Laughter]

McL: I try to be a cheerful pessimist.

N: I had noticed just recently some lowering in the interest rates, and wondered whether you felt this was going to have any effect on inflation.

McL: If anything, it would promote inflation. I think the high interest rates and tight money are one of the means of fighting inflation. Slowing down the economy and creating unemployment--in other words, creating a depression--is almost the traditional way to check inflation, but such steps are likely to be too unpalatable--socially or politically--to be tolerated very long in a democracy.

And now, interest rates are being relaxed. There will be an attempt made to spend more money to get the economy booming again, back toward fuller employment with bigger deficits and more inflation the likely result. If a company runs a great deficit, it goes bankrupt. If a government runs a great deficit, it finds ways to increase the money supply. I'm no expert in this field, Lord knows, but we seem to do it by more subtle devices than by crudely printing paper money. Our practice is to put out more and more issues of bonds and other I.O.U.s. If the public doesn't take them, the banking system must, and the banking system gets a larger and larger base for expanding credit and providing more money.

N: Are you planning to attend any further conferences?

McL: No, this year looks a little quiet. There's a meeting in Portland in April where some effort will be made to have a number of speeches on gold and money. Some of my South African friends are rather urging me to go over to meet them in Europe and attend the meeting of the International Chamber of Commerce in Vienna where there will be a good deal of discussion on the problem, but I don't think I will. So, I guess this will be a quieter year than last year.

N: I don't quite trust you when you say that....[laugh].

McL: You must be quoting my secretary, Janet. This next week we're having a very interesting celebration in New York of the 100th Anniversary of the American Institute of Mining, Metallurgical, and Petroleum Engineers. That's our professional society in the mining fields. I have to make a short speech at one of the affairs. I'll probably mention gold.

XIV THE ATOMIC ENERGY COMMISSION, URANIUM AND NUCLEAR ENERGY

N: In the current debate about pollution and brown-outs, do you feel that concern about depleting fossil fuels is or isn't valid?

McL: Well, the concern should be somewhat relieved now because of nuclear energy. It's a matter of cost, and the cost is just about at a point now where nuclear energy could replace a great many of the plants that use fossil fuels.

There's a fairly substantial supply of uranium--almost inexhaustible when the breeder reactor is perfected--so that you would have really terrific reserves of the fuel material, namely uranium. Today however it is only the isotope of uranium--U235--that is the effective producer of power and that is only 0.7 percent of the more abundant form of uranium our mines and mills produce. If you'd have a breeder reactor where the process creates new fissionable material it enormously increases the reserves of energy that are available in the element uranium. Then if they ever succeed in controlling fusion, the hydrogen bomb reaction, you'd have almost unlimited sources of power from tritium, which can be obtained from the hydrogen in seawater.

N: Are you familiar with the argument that it may be time for us to stop consuming the fossil fuel deposits and save them for synthesizing into something else?

McL: Yes, if you would say it was time to stop utilizing power. Turn off the power on one of our cities and what happens? The only other practical form of power in my judgment that can be developed within reasonable time is nuclear power from uranium. A most intense effort is being made to develop nuclear power to a stage where it would supply a larger and larger percentage of the country's power. The scientific base is now well established, even for the breeder reactor. The difficulties are largely technical. They are still formidable, but I am certain they can be mastered.

But there are other obstacles to nuclear power. The handling of radioactive wastes is of course a major problem, but by no means as serious as one might think from the outcry on the part of the environmentalists who

McL: tend to behave very stupidly and unwisely. Their efforts to block installations at certain nuclear plants have been most irresponsible, in my opinion. The development of nuclear power seems to go in surges. There was a time when too much was expected, then everybody was disappointed. Then there was another great surge.

Now, new difficulties are being encountered. I think before long we'll have some more important technical breakthroughs and then there will be another surge forward, probably with a great increase in power available from nuclear plants.

There's an enormous amount of really technical engineering development, however, that has to be accomplished before these nuclear power developments become highly competitive. They are at a stage now where very great, very large nuclear power plants are competitive with coal or oil, depending on your locality, but modest sized ones are not.

Of course, if you would have one, say way up in the Northern Arctic, where you couldn't get oil or coal, why yes, even a small plant would be competitive. But if you're sitting here in California with sea-borne oil, it wouldn't be competitive at the moment.

Big power companies, however, are turning to nuclear power, because they can see that that's likely to be the great need in the future. They want to be in the position where they've mastered the art and the techniques. It's quite a stand-off at present. Well, five or six years ago, there were more nuclear power plants being built than fossil fuel plants. Now there's a little lessening of enthusiasm for the nuclear power and more recognition that fossil fuels are still important, particularly coal that we have in abundance. These things can't be handled in emotional ways, which I think is becoming so dominant in the current worry about ecology and pollution and things of that sort.

The first people to yell would be our conservationists, if the city had a black-out. "Why didn't you build the power plants needed to prevent this?" There's been such an increase in population, and in comfortable living that the demand for power has grown at an excessive rate. The whole life of the country is dependent now on more and more power. The major source of power is fossil fuels--coal, oil and gas. We are very well endowed with coal but we have to import a large fraction of the oil we use.

From a practical standpoint, you just can't decide to mine no more that a certain quantity of these fuels. Who's going to take care of the necessary expansion? We keep using more and more and more power all the time, not by necessarily planning it that way; it just works that way. An aspect of the age of affluence, I suppose--or the age of extravagance.

Homestake and Uranium Development

N: You were saying a little earlier that Homestake had gotten into the uranium development field. Is this still important?

McL: Oh yes, it is. When we went into uranium, the great demand for the metal was for weapons, and the Atomic Energy Commission, in order to ensure adequate supplies of uranium made contracts in which they would guarantee to buy the uranium produced at a given price. This was done in the fifties. You could put up your own money to build a mill, find the mines, and produce uranium oxide. The AEC provided a guaranteed market.

N: When you refer to building a mill, is that to crush the ore?

McL: Yes, to crush and grind the ore and extract the uranium by chemical processes. Many millions have to go into these mills. The ore is a black oxide, or bright yellows and reds when altered superficially. The conspicuously colored material is found in the shallower deposits in sedimentary rocks. Most of the deposits in our country that were found first were of this sort and most of the individual ore bodies were rather small.

Then some quite extensive deeper ores, with black oxides, were found at three or four hundred, even 1000 feet below, down in wet ground. These were very big reserves. The first of those to be discovered was near Grants, New Mexico, at a place called Ambrosia Lake. I think the name came from a sheep herder named Ambrosio. It was his place where he watered sheep, so that called it Ambrosio's Lake, but it became known as Ambrosia Lake.

The discovery of yellow uranium minerals on the outcrops some years before, that called attention to the region, was accidental, but the finding of the deep ores back in the basin was based on good reasoning. It was a bright piece of exploration by a geologist who put a Geiger counter on the sludges from an old hole drilled for oil. It was a dry hole on a small dome. They didn't find any oil, but he, as a matter of curiosity, wanted to see if they had passed through any radioactive material. There were uranium deposits some twenty miles away, where the beds outcropped south of this valley.

He happened to find radioactive material in the sludge of this old well. So they put down a couple of holes to three or four hundred feet and ran into what turned out to be one of the biggest and most valuable uranium reserves on the continent.

N: Now, when you have a license to prospect for oil and you find something else, is that permission transferable?

McL: No. The oil license is separate. We have a genius for complex and unworkable laws in this country. [Laughter] There were lots of oil leases over some of the ground in which uranium was found. Under the old law, the existence of those leases prohibited anybody from staking claims. But in the Moab region, in Utah, there was a broken down geologist named Steen, as I think I mentioned before, who stuck a hole down and hit some extraordinarily rich ore. All that country then became staked with mining claims. It was really a uranium rush and the little quiet Mormon town of Moab became something like a frontier mining town in the old days--at least in some respects.

N: Do you describe the area that you claim?

McL: Yes. The law prescribes a plot 1500 feet long, and 600 feet wide and "discovery" is a requirement for a valid claim. It's rather a ridiculous law for if it were strictly applied it would be impossible to obtain a title to some of our greatest ore deposits. This country near Moab then became plastered with claims on top of oil leases, which had no real validity. On the other hand the Atomic Energy Commission had been granted complete control of all uranium deposits, so this agency assumed it had jurisdiction and recognized the validity of the claims that had been staked for uranium.

Many very big transactions, big deals, were made, in which these claims of doubtful legality were sold and transferred. It took a new law to straighten it out, to give such claims validity. The new act provided for separate titles to oil or metals in lands that might be valuable for both. That is the law now, so those claims all stand. But there was a period in which those claims could have been declared illegal, by a strict interpretation of the law. The lawyers really missed a chance.

The uranium developments were one of the wild mineral rushes, like the old-fashioned gold rushes, but in the early fifties. But then to go on with the uranium, we got some very good ground developed, a couple of mines in that same country, near Moab where the Steen discovery was. They weren't as good as his, but they were good mines. They are very nearly worked out now.

Then we got into another big enterprise near Grants in New Mexico, in partnership with people who then had some ground in which there was high grade ore and big reserves. We formed a partnership in which at the beginning we had a twenty-five percent interest; they retained a seventy-five percent. We managed it and we financed the mill. That went into a good many millions in mine development and plants.

Atomic Energy Commission Contracts for Purchase

McL: All that was done with the assurance that the Atomic Energy Commission would

McL: buy so many million pounds of uranium oxide at around $8 a pound. That would mean that ore containing one percent of uranium--that would be twenty pounds per ton--would have a gross value of $160, you see, in the ground. Down there, at the beginning, it was running about two-tenths of a percent, so that would be running about--let's see, if my arithmetic's right it would be about $32 gross per ton of ore.

You'd have to pay for the mining and milling out of that, and also make enough to recover the cost of the shafts, mine and mill plants and all the accessory structures, before the ore body had been exhausted, as well as to make enough profit to justify all the efforts and risks.

You finally produce a bright yellow powder, uranium oxide, which the AEC took at $8 a pound of contained U_3O_8. That contract ran until 1966. Then there were some nominal extensions at lower prices which didn't mean as much. The final contracts have just expired now. But in those days you had to sell to the AEC. There was no private market. They didn't allow anybody else to buy.

Then after '66 the market was opened, and since then the big customers have been the power companies. When we went into it, my feeling was that we should undertake the venture with the expectation that we would get our money back including the cost of developing the mines and the mills and make an adequate profit by the end of the contract. Anything else was velvet.

Well, we're still running. But we don't get $8 a pound for it any more. The market's considerably below that.

N: Is it fair to ask what you consider a reasonable profit in percent? Or is that hard to tell?

McL: In a mining property, you see, you have to get your money back within the life of the mine, so the annual net earnings have to return your capital as well as provide the profit. I think in anything as speculative as uranium mining, I use to tell the boys, "Get your money back and double it in five years." That would be a twenty percent return. You very seldom accomplish that much, however. People will buy stocks of gold mines today where the actual earnings as of today are very, very small, so that their profit might be, oh, half a percent or something like that, in anticipation that there's going to be a rise in the price of gold and they will gain a reward. We have nothing whatever to do with what the current price of Homestake might be on the market--except of course to handle its technical activities in a competent way.

N: Do the uranium mines have depletion allowances for tax purposes?

McL: Yes. Depletion really is proper recognition that part of the income from a mining venture is a return of capital and not taxable income. That

McL: allowance, of course, of course, gives you quite a little tax benefit, and that helps.

Advisory Committee on Raw Materials, AEC

N: This brings us rather neatly to your list of activities with the United States government. I wonder if you would like to, perhaps, comment on some of them. I was thinking of your chairmanship of the Advisory Committee on Raw Materials for the AEC from 1947 to '52.

McL: That was an interesting assignment. At that time I had a very good friend who was one of the commissioners, Sumner Pike. In the early days of the Atomic Energy Commission, he felt there should be advisory committees set up to include people who were knowledgeable in the various activities that concerned the Commission; advisory committees of physicists and so on.

He had a good deal to do with mining and oil and he wanted a committee made up of people who knew about ore deposits and could advise on efforts to provide the needed supplies of uranium. John Gustafson was then the first manager of the department of raw materials. He subsequently became the president of Homestake, you know, and is now chairman of the board. I think he and Sumner Pike set up this advisory committee. I wish I could remember all the names of people on that.

N: Perhaps just those who stand out.

McL: Thorold Field was one. He was a grandson of the Cyrus Field who laid the first Atlantic Cable. He was a very interesting person, an engineer and geologist. Everett de Golyer was also on that committee. [Brief interruption to get a book.] I wanted to show you a particular book about de Golyer that was wrapped up to be mailed. There was just a comment in it that Sumner Pike had asked him and Wallace Pratt, another oil man, and myself to serve on that committee. I don't think Wallace Pratt did, but de Golyer did for awhile. Fred Searls, President of the Newmont Mining Company was another old friend on the committee. He was a graduate of our College of Mining, Class of 1910.

That committee was purely an advisory committee. We had fairly frequent meetings and the requirements for uranium, mostly for weapons, were told to us. We were asked, "Now where are you going to get it?"

N: I see. So your function was to advise on exploration?

McL: Yes. It was exploration, largely, and metallurgy too. I remember one of the first problems that was put up to that committee was, "Should some

McL: of these big uranium mills (they were big for those days) in Colorado be reactivated?" They were practically shut down, because after the war, of course, there was to be a lasting peace. There was no need for weapons. [Laughter] Then it was realized that we'd better pay a little attention to our weapon situation and be in a position to make atomic bombs if necessary.

Up until that time, the main source of uranium had been the Shinkolobwe Mine in the Congo, the Belgian Congo. That was a very rich uranium mine owned by the great Katanga Company, Union Minière de Haut Katanga. In a quite dramatic way, the head of that company, Edgar Sangier, got out of Belgium with all the records of the company, the Katanga Company, when the Germans invaded Belgium, and came to the United States. He had a feeling that uranium was important, and shipped a lot of the uranium out of the Congo, for fear they would lose it, into the United States. I don't know how he got the hunch.

When, in the early days of the atomic bomb effort--they were trying hard to get an adequate quantity of uranium they went to Sangier about this and he said, "Yes, it's right here." There was a lot of uranium brought over.

N: How do you store uranium when you bring it over?

McL: Well, uranium in the form of the oxide before it's processed is perfectly harmless. I think he shipped over the uranium oxide, the bright yellow oxide, the product turned out by the mill at the mine. He was able to deliver the great bulk of the uranium needed for the bombs. We had uranium in the Colorado Plateau, but the deposits then known were small; and there was uranium from the Great Bear Lake deposits in Canada--rich ores but not abundant. None of it was adequate for what they were foreseeing to be the demands.

At that time all uranium sources were studied very carefully, and an exploration program was started, especially in Colorado, that gradually spread out to Utah and New Mexico. The Geological Survey made studies, and the Bureau of Mines also.

But the critical thing was the establishment of what was called a field price, whereby buying stations were established in various centers where any miner coming in with his uranium ore could sell it for a fixed price, $8 per pound of contained uranium oxide. Then there were rather generous allowances for transportation, for freight from these little depots. There were lots of little mines which made many of them very profitable. Once it was realized by these prospectors and miners that they could make good money under these terms a lot of intensive prospecting was undertaken and a gratifying amount of ore was found. However, a lot of the drilling seemed pretty speculative especially for what then appeared to be small targets.

McL: In fact, I remember one quite famous mining engineer on the committee, who thought it was just wasting money to drill for such small deposits. And yet eventually, with persistence, some big ones were found.

Steen made the first big hit when one of his drill holes cut rich and thick ore on his Mi Vida claim near Moab. Then things really took off. Uranium had also been found way down in New Mexico near Grants by an Indian named Paddy Martinez on land owned by the Santa Fe Railroad.

The Santa Fe people gave the Anaconda Company a lease on the ground and Anaconda obtained a good contract from the Atomic Energy Commission to purchase the yellowcake from a mill financed and operated by Anaconda. That started uranium production down there. Then the discovery back in the Ambrosia basin that I told you about was made in the same region. These deposits were large, but were much more costly to develop on account of depth in wet and incoherent ground, and such work had to be undertaken by financially strong groups. The Kerr-McGee Company and Phillips Petroleum became major operators, and we did also through an organization termed the Homestake-Sapin Partners, as I mentioned earlier.

But getting back to the advisory committee--the critical step was that taken by John Gustafson--in establishing a field price for uranium oxide that encouraged prospecting by making it possible for a man who found a good deposit to make a really handsome profit. This was in accordance with old fashioned Western traditions, and good competitive free enterprise.

Many of the deposits in the plateau country in western Colorado and southeastern Utah were shallow and small. A person even with just a nominal amount of money could put down 20 or 30-foot drill holes and possibly hit some uranium ore that could be worked profitably. That led to deeper and more costly exploration. Holes several hundred feet deep became common. Now they're actually putting down holes to four or five thousand feet!

It may or may not be wise or economical, but it is being done, in searching for uranium. Well, those holes would cost $50,000 or $60,000 apiece. They are not undertaken by small people. So that's the way that the industry started growing, and changed from little mines operated by a few men to immense operations in which tens of millions have been invested and major enterprises built up.

N: Was there any problem of conflict of interest for the people on the advisory committee?

McL: Yes. I did a very bad thing for my company being on that committee at all because it kept us out of uranium for a time. I really shouldn't have done it, because after I got off the committee I had to wait at least a year before we got into the business.

N: Oh, does the law require that?

McL: No, the law doesn't require it specifically, but it seemed a proper legal precaution.

N: Well, you probably have a greater feeling of nicety perhaps than some other people.

McL: But then the deposits that we eventually acquired hadn't yet been discovered. We were all in it as a patriotic effort and it didn't look for a while as if there were opportunities or need for more than the two or three large mills already in operation. The Anaconda near Grants was one of the first big ones to be built after the intensive search for new deposits had started to yield results.

Of course, the United States Vanadium and Union Carbide Company had mills in operation much earlier. Those mills had been developed primarily for vanadium before the war. Uranium was first a by-product and then it became by far the dominant source of profits.

N: I'm going to have to ask you what vanadium is. Is it a metal?

McL: It's a metal. A metal that's used as an alloy in special steels.

N: Is it a hardening agent?

McL; It's a hardening and toughening element.

N: What a fascinating field this is. You were talking really about trying to ease the financial problems of the gold mine by moving into another area.

McL: Uranium was the first diversification that was really important.

N: You were saying then that it wasn't until after you had left the advisory committee on raw materials that your own company ventured in.

McL: That's right. I think the thing that brought it to a head were uranium discoveries on the western and northern flanks of the Black Hills.

N: Right near the original Homestake Mine?

McL: They weren't near the mine. They were out on the flanks of the hills out in the sedimentary rocks, a totally different type of deposit from our gold ores and in a very different geologic environment. It became obvious that it was utterly ridiculous to have something developing under our nose and we weren't participating in it, so I got off the advisory committee. There had been a few discoveries in which we had been involved in rather a small way, and we were starting to look around.

McL: One of the deposits we found and developed became a profitable small mine, but none in the region could be called a major ore body. Even so, we should have built the mill up there, but we never seemed to have enough ore and eventually another outfit got around to it.

Management, Exploration and Partnership

N: You were saying something earlier that interested me, that your company ventured with others and often had the managerial responsibility. Was that a specialty of the Homestake organization?

McL: To some extent. It's a good mining technique, for exploration is so extremely costly that it seems at times wise to share the risk, particularly with an associate who was stronger financially than we were. We have a good staff and we have a good reputation, so we were able to find partners who were willing to participate in the venture with Homestake putting up x percent of the money and taking over the management, with our associate putting up the balance. We have one quite important piece of exploration in uranium going on like that today.

N: So Homestake would then be the originator?

McL: Yes. That works especially well in a field where certain big organizations, such as power or manufacturing companies, want to have an assured supply of raw material. They're not apt to be mining people. They will turn to mining people and they'll put up the risk money or a good fraction of it. The other company puts up the technical direction and some money. That's a good technique. On the other hand, a much larger company, such as the International Nickel Company, is so big and so powerful that it can expend ten times as much on exploration as we could.

It generally wants to handle it alone and take all the risks, and also all the profits in a successful venture. Nobody is likely to be invited to join them though occasionally an exception is made under some particular condition. But Homestake just hasn't that sort of money, and as a rule we like to have a partner to reduce the cost to us and share the risk. We are a substantial company but a relatively small one compared with the giants.

N: Do you have any personal preference for operating with a larger or smaller company?

McL: Oh, no, I don't think so. The large companies are extremely complex organizations, and I think a young man starting in one of those companies can see that the target with high success is a very, very big one indeed, but also that he could be submerged in the routine of a complicated

McL: organization (I don't like to use the word bureaucracy, but there's almost a similarity between a very big company and some great arms of the government.)

The rewards at the top are very much greater than the rewards that you'll get with a smaller company, unless that smaller company happens to become very profitable, which of course could happen.

N: Making your mark, I suppose, is a little easier perhaps in the smaller company.

McL: I think so. On the other hand, let's say a person in the management of the Standard Oil Company of New Jersey is involved with an enterprise that's much greater than many governments. In many cases the men who've gone to the top are people who've come up through the technical ranks, many of them as geologists or as engineers. (I'm just pulling that out of the bag, for I happen to have known some of the presidents.)

N: Curious that that training would lead to a management post.

McL: Well, it led them into it at the right time. They had their particular type of ability and it led them into management. If they'd stayed in geology of course they never would have done that, but they saw what it took after the oil fields were found to make profits out of it; they were men of managerial ability and up they went.

N: Thinking again about some connections you mentioned earlier--at least they sounded like connections. Is uranium commonly found where other deposits are found, for example, was there uranium near the gold?

McL: There was no relationship between the Homestake gold and uranium, but one of the great sources of uranium outside the United States has been the gold ores in South Africa, in the Rand. There's a very small amount of uranium ore we mine here, but it is mined with the gold, which is generally more than enough to meet the full costs of mining. It is really just a matter of bookkeeping how the charges are distributed. The gold pays for the mining and even the crushing and grinding of the ore, so you are simply recovering a by-product from the tailings--the refuse from the gold mills. The output is large and it is cheap uranium since the gold meets a large part of the cost.

Now, the existence of uranium in those ores was known for quite a while. It was pointed out in the early days of the search for uranium by an American geologist named Bain, who called the attention of the South Africans and the Americans to the existence of uranium there. It had been reported by several earlier workers, but that was before there was any demand for the metal. I know that in the early meetings of the advisory committee, it was realized that the South African gold ores might contain a large quantity of uranium. This proved to be the case and metallurgical studies

McL: undertaken by the AEC showed that it could be recovered successfully in spite of the relatively low grade.

So John Gustafson went to South Africa and negotiated contracts with the South African government and the mining companies to build mills and extract the uranium before we were at all confident that adequate deposits existed in the United States. Uranium was urgently needed then, and it turned out to be an important source of profits for the South Africans, and it still is even on the open market, the market as it exists today.

Those deposits are most unusual. The gold is in an ancient sedimentary formation and confined to certain remarkably persistent beds of conglomerate, called reefs. The gold is in these thin layers of white quartz pebbles and sand, and the deposits are regarded by most geologists, over there particularly, as ancient placers.

It is thought that the gold was derived from the erosion of some distant gold-bearing terrain and was washed down by streams and mechanically concentrated in layers of gravel, just the way it was in the Sierra Nevada, except that in the Rand the beds are far more extensive. There are miles and miles of country where these rocks, which are now extremely hard and firm, are being mined. That's where the gold is.

It's very interesting that the uranium has concentrated in those ancient gravels also. In the Colorado plateau, the uranium is generally in sands and gravels too, though not in as well cemented rocks as the far older beds in the Transvaal, where this combination of gold and uranium supports the world's largest underground mining operations. Some seventy-three million tons of ore are mined and treated per year.

On the other hand, in Canada, there are important uranium deposits in similar ancient gravels--now hard rocks, conglomerates--but unfortunately there's no gold in them at all. They're exclusively uranium. Rather low-grade, but very extensive.

The gold in the Rand ores was probably originally concentrated by a mechanical sedimentary process, and the uranium may have been brought in by a process perhaps somewhat related to that, though I don't think it could have been exclusively mechanical. Migrating solutions carrying uranium may have had something to do with it, though perhaps when these particular beds were rather loose gravels. But on this continent there is no association between gold and uranium. There's no gold in the conglomerates and sandstones in which the uranium occurs and there's no uranium in the deep mines like the Homestake or the mines of California, the gold mines.

Uranium in Other Associations

McL: But then, you were asking about other associations. Vanadium is the only other valuable element associated with the uranium ores in the Colorado Plateau. There have been some cases where there's a little copper, and quite a complex variety of other metals in small amounts, but generally not commercial quantities. But the vanadium is commercial.

These deposits were first worked for the vanadium--that is, in the Colorado Plateau, by Vanadium Corporation of American and the U.S. Vanadium Company, a subsidiary of Union Carbide Company. There were several vanadium mines there, prior to the war. The uranium then was not regarded as an important by-product. Now the balance has completely shifted, and the vanadium is a relatively minor product in terms of revenue now. There are many uranium ores, including our ores down in New Mexico that contain some, but it doesn't pay to recover more than a very small part of it.

The vanadium is still in the tailing dumps, the residues that came out of the mills, and if the need for vanadium ever became great enough those ores could be--or those tailings, those residues, could be reworked for vanadium.

N: In the various geological surveys, I assume there are notes kept of where everything is?

McL: Oh yes. The Geological Survey itself must have voluminous files on all those things. The companies' reports, theoretically at least, are confidential unless they're willing to make them public. However, there's a lot of information published on the technical aspects of mining and the nature of these ores and the methods of extracting the metals. I think the companies have been very generous in their publication of technical details. There's a general feeling that, if everyone publishes everybody would benefit.

N: Is that your own feeling?

McL: Yes. Europeans are much tighter than we are in giving out information of that sort. They hold their information in a very confidential way, as if they had a monopoly on it. I think the general American practice has been much more open.

In the early stages of exploration, where there is competition for getting hold of properties, of course everything has to be extremely confidential, with no leaks of information. That is, if somebody puts down a drill hole, and he hits ore; he may have only a limited area under his control, in which case he would have to acquire a lot of adjacent ground to cover enough ore for a successful mine. So the news

McL: of a fortunate strike generally has to be kept extremely confidential in the early stages at least.

N: Yes, rumors must be wild because the word must get around that someone is acquiring property.

McL: A troublesome case of that recently was when the Texas Gulf Sulphur Company put down three drill holes and hit a very, very important deposit about twenty miles north of the old gold camp of Timmins in Canada. Even before those holes were assayed, there was some loose talking and information got out that led to a lot of trouble. It was surely an example of the need to hold all results in strictest confidence until the title to the property had been fully acquired, and during that time no one who had knowledge of the results of the drilling should have taken advantage of it.

Uranium Uses and Prices

N: From what you were saying a few moments ago about uranium discoveries on the Congo and on this continent, is there uranium also on other continents?

McL: Yes. Uranium is not really a rare metal, or element. At a high enough price, there are certain types of very large low-grade deposits that could be worked. At $8 a pound, which would be regarded as a very nice price today (that was the AEC price for the contract periods), exploration would be going on much more intensively than it is today. Now we're sort of marking time again for the next surge forward in nuclear power.

There is only a relatively small quantity of uranium required for immediate uses but a fairly large demand for delivery at dates in the future when it is anticipated that many more nuclear power plants will be completed. When the next surge comes, the demand and the price will probably take another sharp increase.

But if the price of uranium were, say, $50 a pound (that possibility was actually discussed in the early AEC days when the need for uranium was so urgent) there would be enormous deposits of very low grade material that could be profitably exploited. Many phosphates deposits that are being worked for fertilizer contain uranium that could be profitably recovered at a price considerably less than that.

There's one huge deposit of just plain black shale that runs all through the Appalachian region called the Chattanooga Shale, that has a small amount of uranium--a very, very small amount of uranium, (.005% more or less)--but at a price it could be recovered. And

McL: if for example the breeder reactor were ever developed in which probably the initial cost of uranium, of the fuel, would be a small part of the final cost of the power over the years, you could pay a high price for that fuel, and there would be almost unlimited quantities of uranium available. In a breeder reactor, you know, new fissionable material is created. It would make all the ordinary uranium a source of power, and the potential supply is very large.

N: Could the price of uranium be arbitrarily set by the federal government if it were desirable to do so?

McL: I suppose it could be. But I think a better way would be to have the price determined by supply and demand, as is customary in a free enterprise system. The AEC originally set prices in its contracts for purchasing uranium. This agency had complete control under the Atomic Energy Act. But even then there was a desire to promote competition among the miners and mill operators and to stimulate production.

N: Was that a war measure? Is that why that was permissible?

McL: That was a war measure, at least a cold war measure. Uranium was kept out of private hands, in our efforts to try to maintain secrecy about everything pertaining to the atomic bomb. I think it was realized then and it is certainly true now, that any country that has a nuclear power plant could produce fissionable material that could be used in atomic bombs. I think you'll find Israel having one some of these days; South Africa I'm sure is capable of making them. Of course there are still many matters related to weapons that are kept very secret, but uranium, even enriched uranium, is available.

Most of the big power companies now are buying uranium for their own future needs. That's our major market for uranium today, the power companies. They don't want it right now, they want it five years from now, so we'll have to sell to them at a price discounted for that period in the future. That gives us a pretty poor present price, of course.

N: Are nuclear power plants still considered dangerous?

McL: A nuclear power plant is really not dangerous with all the care that must be taken. There hasn't been a single explosion in a nuclear power plant except in one experimental plant that got into trouble out in the Idaho AEC. It was an early experiment, and now the technology has gone so far beyond that. That's like trying to block the steam engine because boiler explosions were very frequent in the early days of the steam engine.

N: Yes. You may have some views on the apparently current discussion of dividing up the powers of the AEC, and reassigning them?

McL: Yes. I saw that in the paper this morning. In a way you might say the problem is the overall problem of energy, and one department possibly should handle that; except I don't see why it's a function of government to get into some of those things. I think the AEC which has the responsibility for nuclear weapons is in a very special position, and I would hesitate to destroy the effectiveness of the AEC at this particular time.

I find the emotional response of this age against anything that's nuclear ridiculous. Anything that is any way related to the atomic bomb seems to arouse blind opposition. I think that the young men--they're not so young now--but the young scientists and engineers at Los Alamos and Livermore and our own Radiation Laboratory who contributed to the principles and developed the techniques that eventually led to the atomic weapons, should be heroes in America. They've really saved us.

If we didn't have an arsenal of atomic weapons, I doubt if we would be an independent nation today. I can't imagine the Russians sitting with a mass of atomic weapons and not using them--or threatening to use them if we couldn't retaliate--to enforce their will. Whether they exploded them or not's another story. So I think we owe these young scientists a tremendous debt, and all they're getting now is abuse.

N: Things go in cycles.

McL: Don't they, now? This is the craziest age in my long life.

N: Well, it keeps you interested, apparently! [Laughter]

McL: It certainly does! And it's gotten worse this last year.

Plowshare Advisory Committee

N: This reminds me that you have been involved in the Plowshare enterprise.

McL: Yes.

N: And you have been on the board?

McL: I am on the Advisory Committee--I'm going down to be in Los Alamos on next Wednesday or Thursday for one of its meetings.

I really think there are tremendous opportunities to use atomic energy effectively and wisely, and this peculiar public hysterical

McL: attitude about it is almost like the attitude of Chinese coolies against the railroads.

N: You think we have another Luddite rebellion here?

McL: Just about, yes. It's perfectly silly. You talk about an atomic plant, and everybody is up in arms about it.

N: Do you think it's a fear of safety hazard or of heat pollution that causes this sentiment?

McL: I don't know, but it's reached a stage now that it seems to me just plain hysterical. A great power plant can certainly be designed so that it is rather a handsome structure and as earthquake proof as anything can be. Now it takes years to get the necessary clearances--and delays in a time of inflation are very costly. With the ecologists now raising the roof about anything that disturbs the natural environment in any way, it is hard to see just how the future demands for power are going to be met.

N: How often does the Advisory Committee meet? You say you're going to attend a meeting shortly?

McL: About every six months. It's not an active committee, it's just one of the advisory committees. The members listen to reports by the AEC staff and hear about some of their problems, usually financial, and write letters of advice.

N: I see. But rather fascinating for you, I would think, because it keeps you in touch. Were you named a member of the Plowshare Advisory Committee in 1959?

McL: Yes. Edward Teller really was responsible for my getting that appointment I think. He was very keen about projects of the Plowshare sort, ever since he was in charge at the Livermore laboratory.

N: Are there other people of interest on the committee?

McL: Jimmy Doolittle is on the committee. He's an awfully nice fellow. And Bill Libby of UCLA. Willard Libby. And Bascom who is a well-known engineer. Rutledge, another well-known engineer. It's a mixture of engineers and scientists. It's an interesting group. We've become very good friends. But the thing is a bit frustrating, because there have been so many blocks put up before we could really do much.

A lot of scientific information and technical information has been accumulated from it. They carried on a large series of high explosive tests to try to work out the technical details of excavation by high explosives, and they've also had a few nuclear explosions of that sort

McL: before the test-ban treaty prohibited further explosions in the air. Plowshare is also interested in developing devices that would reduce the amount of radioactive material in an explosion.

So I think by and large some tangible results will come out of Plowshare, but they may not be exactly along the lines that were anticipated. In the long run, I think the whole scheme will be one that everybody will say was justified.

N: Things take odd diversions.

McL: Oh, they take so much time too.

Plowshare and "Chariot"

N: Thinking again about the different uses of atomic energy, is Plowshare primarily non-weapon?

McL: Plowshare is supposed to be concerned exclusively with the peaceful uses. The devices that are used are of course related to those used in weapons. You could imagine the uses of atomic explosions to create big excavations by blowing huge craters, and excavating, say, a new Panama Canal, or excavating a harbor, or a big railroad cut through a mountain, or something like that, just by the very force of an explosion that would blow material out of a crater and out on the rims.

But since the Russian treaty has prohibited any explosions where any radioactive material is to be vented in air, that type of explosion is ruled out. Unfortunately the Russians were farther advanced in their test explosions than we were before the treaty went into effect. They had completed several very big explosions in the air just before the final date of the treaty and we weren't even ready to do it. It gave the Russians an immense lot of valuable data.

We had several things planned. One was a project called "Chariot" up in Alaska, where there was a harbor to be developed by an atomic explosion. The ecologists raised objections, some of which seemed very extreme.

I think the large number of investigators who were assigned to the project did more harm to the ecology than the explosions would have caused. The money they spent must have disrupted the local economy rather seriously. [Laughter] They certainly did a lot to upset the way of life of the Indians. There were millions spent on the investigations. And millions of dollars can do a lot of damage to any simple community. There was even a long report on the number of birds' eggs that might be damaged.

N: Where would "Chariot" have taken place?

McL: North of the Bering Strait on the northwest coast of Alaska.

N: Would this have served the oil pipeline?

McL: No. The oil hadn't been found then. And the Prudhoe field is far to the northeast. I think it was intended primarily as an experiment to show what could be done rather than an effort to meet a practical need. I doubt if there was really any demand for a harbor there.

N: Could an atomic explosion change the balances in the earth as earthquakes do?

McL: I don't think so. Oh, a bomb might trigger an earthquake if it were detonated in a region where stress had accumulated and the shock caused its release along a fault. But the energy in the greatest atomic explosions is far less than that released in a major earthquake. I believe that little shake last night probably had more energy in it than several atomic bombs that would go off at a depth of ten miles, or so.

Explosions Deep in the Earth

N: In addition, let's say, to those explosions in the air, what other sort of thing does Plowshare attempt?

McL: One possibility, for example, is to explode the device at great depth and shake up a big mass of rock. Let's say a very, very low-grade copper deposit--a porphyry copper that was too low-grade to be mined by our present methods--such an explosion would shake up and break the rock so that the copper might be leached out of it by dilute acids that could be percolated through the broken ore to dissolve out the copper. The solutions could then be collected and the copper precipitated from them. That is one possibility.

Or possibly a deposit could be made more susceptible to cheap mining by shattering it with an atomic explosive. Then there's another possibility of useful service by detonating an atomic device in certain gas-bearing formations where the rock was too tight to release gas in commercial quantities, but might if it were shaken up by a big explosion.

There have been two tests of that sort where the atomic device was exploded at a depth great enough to prevent any radioactive products from leaking out at the surface. The first one called Gasbuggy was in northern New Mexico. The last one was called Rulison. It was in Colorado. That caused a terrible hullabaloo--lawsuits to try to block it,

McL: and so on. But there's no evidence whatever that there was any hazard from it.

N: Does it make natural gas available for pipelines?

McL: Yes. All it does is to jar and crack the rock. In gas fields where the release of gas has become too slow to be commercial the flow sometimes can be stimulated by exploding nitroglycerine in the wells. That's been done with some degree of success. In the atomic tests it is hoped that by shaking up a much larger mass of rock, gas can be obtained from a lot of ground that is now unproductive. Of course an atomic explosion will create a greater flow of gas--no question about that--but whether there will be enough new gas created to justify the cost is another story. Atomic devices aren't cheap.

Then, of course, you've got to be awfully sure that there won't be any radioactive materials in the gas. There was a test made at the Four Corners area in New Mexico that's been under study for quite some time. It'll take a long time to evaluate these tests and know how long the stimulation lasts and when the radioactivity in the gas declines to a point that makes it perfectly safe. It's still very experimental.

N: What do you foresee as the next direction that Plowshare might venture into?

McL: There are really dozens of different devices. One would be to make a great rubble mass at great depths in the earth and use it for storing gas. You see, there are times when there's a great deal more gas available than can be used, and in California gas of that sort has been pumped back into the earth into geological structures that will store it and from which it can be taken later.

In the eastern United States there's a great seasonal demand for gas. There's been discussion of using atomic explosives at great depths to create a mass of broken rock that would serve as a receptacle. Well, that hasn't even been put through the experimental stage--that's just a possibility, but a very reasonable one.

Or here in California you can imagine doing the same thing in some valley for storing, in the winter, waste waters. Take some of these creeks that become great flooding rivers in the wet season and now just pour into the sea because the ground's too tight to absorb the excess water. Shake it up, get an underground reservoir, have it available for later pumping--that's a possibility.

One of the things that has received some preliminary study is the use of atomic explosives to excavate a new canal in Panama, or Colombia or Nicaragua. Simply from an engineering standpoint, it seems that the use of atomic explosives as a means of excavation might be cheaper than

McL: conventional methods using high explosives but think of the hullabaloo about that! First of all, a treaty with a foreign country would have to be negotiated. No radioactivity could be allowed to escape. And there are a few scattered Indian tribes about there, and their ecology will have to be preserved.

N: Would there be a danger of radioactivity?

McL: Yes, and such a project using atomic explosives that would vent into the air would violate the treaty with Russia as it now stands. Perhaps the radioactivity could be reduced to a low enough level to be permitted under the treaty, but it's uncertain. They are working, developing types of explosives that would produce very much less radioactivity than the bombs of twenty years ago. They're relatively clean, but they're not perfectly clean.

N: Is one of Plowshare's major objectives to experiment and increase knowledge?

McL: Oh, yes. All this is still experimental. I don't think that anything's come out of Plowshare yet that has clearly demonstrated ways that atomic explosions can be economically used. There are still many uncertainties to overcome, not to mention a lot of unfounded prejudices. The effects of radioactivity are not too well known, and some extremists insist on standards that would prevent any one from travelling in a high flying air plane. Two medical people at Livermore have come out recently with a statement about the dangers of radioactivity--radiation--that seems to me to be pretty extreme.

N: Oh. I'm not familiar with that particular statement.

McL: Well, they've said that all the standards for protecting people against radiation are much too low, and they are proposing standards that would make it far more costly to use nuclear energy. They really don't know. And naturally in the prevailing state of ignorance there is a tendency to play safe, to impose excessively exacting rules. Actually at high altitudes you're exposed to far more radiation than we are here.

I should be dead by this time because of living for some years at 14,000 feet in the Andes. [Laughter]

N: Yes, and on top of a horse, besides! [Laughter] Perhaps time will answer some of these objections.

McL: Oh, I doubt it. But probably all of these things will eventually be worked out. But they cause serious and costly delays. It's typical of our free enterprise system that everybody has his say and you go from one extreme to another.

N: Yes. Is Plowshare financed entirely by the AEC?

McL: Yes, to a large extent. But some of these experiments that are under discussion, especially the gas experiments, have been in conjunction with private industry; with both the AEC and private industry putting up a certain proportion of the cost. If the copper leaching experiment is undertaken, it would be done in association with a mining company.

N: It's a partnership arrangement?

McL: Yes. Rather a complex contract. The El Paso Natural Gas Company put up money for some of the work in New Mexico, and the Kennecott Corporation's had under consideration the financing of the leaching experiment with copper, as I mentioned.

Atomic Energy Commission and the University of California

McL: The Plowshare Committee is my one connection with the AEC now. Of course, when I was a Regent I was closer to some of their problems.

N: Yes. Were there still contracts being negotiated with the University?

McL: Yes. Los Alamos, Livermore and the Rad Lab have been operated by the University under contracts ever since the end of the war--ever since the early days of the AEC. These are the contracts that the faculty now seems concerned about.

N: Yes. I was interested to see this: the entire contractual arrangement is up for review. Is this a Regents' decision?

McL: It's primarily the responsibility of the Regents but I can't imagine the AEC wanting to go on with these contracts if there was intense faculty opposition.

N: Are there other places with which the AEC could make contracts if the University of California doesn't want to continue?

McL: Oh, yes. The AEC could now run the laboratories themselves without any trouble--it wouldn't bother the AEC at all. Except that the staff of these great laboratories value their association with the University of California. I think there could have been a very much closer tie that would have been mutually beneficial. The staffs at these great laboratories include many first-rate scientists, but because they don't conform to some of our rather arbitrary academic standards, our faculty is not inclined to recognize them, or at least to accept more than the few who have had or retain their academic standing.

N: That has always seemed very peculiar to me.

McL: Oh, I think our faculties are in disarray, I hope temporarily. So many are inclined to be extremely liberal in dealing with the problems of others--or of the world-- but very conservative, even reactionary with regard to their own privileges.

N: Is the problem that these very brilliant scientists do not have academic standing?

McL: There's probably a greater percentage of Ph.D.s in those three institutions than in many colleges, but they haven't gone through the usual committee procedures of our Academic Senate, so they're not really recognized. Of course that's not so true with the Lawrence Radiation Laboratory, because of the traditionally close association with the Department of Physics. But it's true for Livermore or Los Alamos.

Edward Teller was very anxious to get a school of applied mathematics and applied sciences started at Livermore, to utilize the talent they have out there. The Berkeley faculty wouldn't hear of it, and finally it was worked out with the engineering school at Davis, which by a rather narrow vote, was willing to cooperate.

The work at Livermore was started under the management of the Davis engineering faculty. To some extent it's been quite successful, but not nearly as it could have been if it really had, I think, enthusiastic faculty approval.

N: You're in a position to have seen it on all sides, aren't you?

McL: I shouldn't say these things.

N: Well, these are facts.

McL: But, I don't know--I've become very disillusioned by some of the things I see in the way bodies of the faculty function when they get into matters that are largely administrative.

N: Apparently, if I understand it correctly, in order to apply for a grant, no matter what your Ph.D. or other degree may be, you must have a faculty person as the official head, the principal investigator or the official responsible person.

McL: That would be from the National Science Foundation or some organization like that? Yes. Or a Rockefeller grant, I imagine. Those grants I believe are made to support the research of the member of a faculty who formulates the project, but the actual allotment of funds is through the institution.

N: But apparently there must be some faculty person in whose name it is

N: submitted, even though he may have very little to do with the operation of the project.

McL: The faculty member is responsible for the direction and management of the project, even though much of the actual work may be delegated to younger men. And the grants are really made to the Regents of the University or to the trustees in other institutions, and then through that body, to the professor. I suppose that is the best way to do it.

N: Yes. Of course, the overhead charge, if I understand correctly, that the University has been able to negotiate in its contracts, has been very important financially.

McL: Well, yes. There is perhaps a certain artificiality about it. But it recognizes that in undertaking a research project a University should be compensated for its contribution of space, administrative talent, staff, etc.

I think too these laboratories wanted the prestige of being part, in a sense, of the University, and most of the staff valued that connection highly. The affiliation probably made it a little easier to recruit competent scientists, even though they were not given faculty status.

The benefits they got from the association, however, are probably not so important that it would be seriously disturbing to the AEC to have to find another contractor such as one of the larger industrial corporations with experience in research and exacting technology. Some are inclined to question whether it is the proper function of the University to serve as contractor for these projects.

N: What is your view about the propriety of the present arrangement?

McL: I think it was, when it started, a patriotic duty of the University to use its talents to do all it could to assist in the development of great laboratories even when they major objective was to design and build weapons. The University should be proud of having contributed to the defense of the country, not a bit ashamed of it.

N: In a curious way, of course, almost a parallel appeal is being made to the effect that the University should now turn to making a big contribution in another area.

McL: At the start, of course, the University made a major contribution in providing some of its most capable and distinguished scientists. In recent years, it served largely as a financial manager and exercised only a perfunctory control over personnel and salaries.

N: Oh, is that right?

McL: That's about all.

N: I didn't realize that.

McL: They also approved general salaries and some major expenditure items, but programs, budgets and practically all really essential matters were handled directly by the AEC.

I know of no case where the Regents ever turned down the recommendation of the director of the laboratory who selected his staff and knew what he has to pay to get the men he wanted. And the salaries that they've paid, on the whole, have departed from academic guidelines--I don't know what they are now but for that type of work in laboratories of this sort, salaries had to be more competitive with industry than with those in the academic world.

N: Well, you may have indicated one point of friction there.

McL: Yes, there is a little bit. Well, of course our faculty and others made an immense contribution during the war, with Ernest Lawrence, Robert Oppenheimer, Edward Teller and all that group at Los Alamos. They were an extraordinary, able and distinguished group of scientists who were drawn into the work as part of a patriotic war effort, to which everyone whole-heartedly subscribed. There was no criticism of serving the country whatever in those days. The Radiation Laboratory on the hill was just as closed an area as Los Alamos, then.

After the war when it was decided to go ahead with intensive atomic research, the University then faced the problem: Should it continue to direct these laboratories? The Radiation Laboratory on the hill was so much a part of the University, that seemed reasonable.

N: Let's see, this was the period when you were on the Board of Regents, was it not?

McL: That was just before I was appointed. The Los Alamos laboratory in New Mexico was certainly a step beyond any normal call of duty, but the University had played such a part in organizing it that I think the Regents were practically unanimous in deciding to continue as the contractor. I'm sure [John Francis] Neylan did; he was tremendously interested in that whole effort, and Lawrence carried great weight in those days--Ernest Lawrence. So I am sure the Regents went on with enthusiasm.

Bob Underhill, the Secretary of the Regents, was the official directly involved with the negotiation of the contracts and he did a job that won high commendation from both sides. The University was adequately compensated financially and also in prestige for its service, and I am sure the AEC was well pleased with the way the University functioned.

McL: It was hoped that the money that came from this overhead could be retained entirely under the control of the University and used for projects related to science. But those funds have been used for quite a number of other projects, and now, unfortunately, the Legislature's had its eye on them and is inclined to insist that they go into the general budget, thereby reducing its overall appropriations to the University. So it's not of much financial advantage to the University at present; it's an advantage to the State of California.

N: Right. So it was not possible to earmark the funds from overhead and hold them?

McL: We tried to.

N: [Laughter] Yes. When you became a Regent the decision had pretty much been made already.

McL: The raid on the funds accumulated from overhead charges came later, while I was on the board. There were various contracts, renewals of the contracts to be negotiated in these years, largely by Bob Underhill on behalf of the Regents.

N: Yes. In his Oral History interviews he speaks of this, you know.

McL: Oh, he did a superb job of negotiating the AEC contracts, as well as handling many other complicated financial matters in which the University was involved.

N: Right. You've made a very interesting distinction between the Lawrence Laboratory and the Los Alamos establishment.

McL: The Lawrence Laboratory is so intimately a part of the University--it's right there on University land, and so many of the people in the Lawrence Laboratory hold professorships in the department of physics or chemistry.

N: But this is not true of Los Alamos?

McL: I think Norris Bradbury is the only person at Los Alamos who holds the rank of a professor in the University of California. They have worked up a cooperative arrangement with the University of New Mexico, for something on the order of--not parallel to, but in some ways similar to--what Teller has been trying to do at Livermore.

XV INTERNATIONAL NICKEL COMPANY AND SOME GEOLOGIC CONCEPTS

N: Is International Nickel something we should talk about a bit more?

McL: Yes. I'm getting to be one of the older directors on the board now, both in service and in years. It is a company, I should think, about forty times bigger than Homestake. It's an immense mining company. Their largest operations are at Sudbury, in Ontario north of Georgian Bay. In the last fifteen years, however, the company developed a new nickel district in northern Manitoba where a number of large mines have been developed and a concentrator built, as well as a town which is now second only to Winnipeg in the province. The town is named Thompson, after John Fairfield Thompson, who was the chief executive officer during the years the deposits were found and the mines and plant brought into operation.

A few years ago the consulting geologist died. He was the third one after Graton had retired. When I happened to suggest a name or two as possible successors, Harry Wingate, the president of the company asked if I wouldn't help out for a while as a consultant. I said, "I don't know enough geology any more." But I have been doing it for several years now though I haven't had time to do more than make occasional short visits to the mines, much less time than Graton was able to give them. However, I have really enjoyed pretending I was a geologist again, and having a wonderful time. [Laughter]

N: It must be very stimulating.

McL: It is, for me at least. Even though I think my geology is pretty rusty, it still is possible to get into some pretty lively discussions. Of course, as always happens in mining districts, the concepts of the geology gradually grow, change, as the years go on, and sometimes some new, very spectacular ideas come out of it.

Geology of the Sudbury District

McL: There's one from the Sudbury district now concerning the rather unique structure that exists there. The most distinctive feature there is a great oval basin, about thirty-five miles long, formed by a thick layer of intrusive crystalline nickel-copper ore bodies at intervals generally near the base or in off-shoots in the floor.

As we mentioned earlier, a recent theory is that the structure was the result of an impact of an asteroid or a very, very large meteor some billions of years ago. It is a most unusual structure and it is not unreasonable to attribute it to an unusual event. Strangely enough, this theory is now being taken seriously. It seemed like a wild idea seven or eight years ago, and now a lot of evidence is turning up that fits into it nicely, and I'm inclined to think the majority of geologists up there now accept that hypothesis.

N: And how is this oval area located?

McL: Oh, I would say it is in a north-east, south-west direction, perhaps twenty miles across. It's a great big spoon-shaped body of rock. The principal rock of the Sudbury intrusive is called norite. It forms a spoon-shaped body that outcrops in low hills surrounding a central flat area developed on softer rocks. Most of the interior of the basin is farm land, in contrast to the rocky hills with many lakes in the ring that surround it. If you get the light right, the structure is quite conspicuous from an airplane. From the ground you don't see it so very clearly.

Then around the outer margins of this peculiar spoon-shaped mass of rock are great deposits of nickel-copper sulfides, the greatest ore bodies of that type in the world. The International Nickel Company [INCO] operates a succession of big mines around there and some very big metallurgical plants, concentraters and smelters.

There's another company. Falconbridge, of which Horace Fraser--a former Harvard student in my days there--was the president; he died a little over a year ago. It's a large company but still much smaller than INCO.

N: Assuming then that an asteroid did hit the earth, would it have created an indentation or a hill?

McL: It probably made a great explosion and I would imagine it created a crater with a rim that rose very much beyond the present surface of the earth at that remote time. The area around, for hundreds of miles, is known to geologists as the Canadian Shield. There ancient rocks: gneisses, schists, greenstones and granites are exposed where they are not covered by glacial deposits or swamps and lakes. It is an extremely complicated

McL: terrain, geologically speaking, of very, very old rocks. What the surface was like when the asteroid is supposed to have hit is hard to say, but if that really happened, what we're seeing is just the roots of the disturbance caused by such an impact and not the great moon-like crater that may have existed several billion years ago or something like that. It's an extremely ancient event, and all we can see are effects that have survived a lot of later changes and long erosion--and the final episode almost yesterday geologically speaking, which was glaciation.

A Moon-Type Crater in Arizona

N: Have other, similar formations come to light?

McL: Yes, there are a great many structures around the world that are now being interpreted as meteor impacts. The craters of old impacts have been obliterated and the event is revealed only by residual effects that have survived erosion.

A crater in Arizona, known as Coon Butte, which is over four thousand feet across and some five hundred feet deep, is generally thought to have been caused by a meteor. Of course that was a pretty recent event compared with the ancient collision that may have left its mark at Sudbury.

When you see it from the air, the crater in Arizona looks like one of the craters on the moon. It's a much, much smaller thing than Sudbury. There probably was an explosion when the meteor hit. There is no volcanic rock around it at all, and it really seems to be a typical moon-type crater.

N: And is there nickel-copper sulfide ore there?

McL: No, there are no metals in it at all. One company drilled a hole under it. They didn't get it down very far but they didn't find anything. Most of the geologists in Sudbury do not attribute the nickel and copper to the asteroid. The most accepted theory is that the nickel and the copper sulphides just took advantage of the cracking of the earth to rise up and become distributed around the margin of a solid mass of rock--the intrusive sheet of norite that now forms the great oval basin.

N: The asteroid did a little metallurgy? [Laughter]

McL: Yes, it's possible; I don't think it can be disproven, that the copper-nickel came in with the asteroid because many meteors do have nickel in them but none have copper. But that doesn't seem to be the prevailing theory now. There are, in many places in the world, ancient structures that are now interpreted as the results of the impact of huge meteors or

McL: small asteroids, or somethingof that sort that left bruises on the earth, so to speak, even after the craters had disappeared.

N: Thinking just a moment about the craters on the moon, is it thought that those are the result of volcanic activity or impact?

McL: I think today it is believed they are of both types. Mostly, I think, they're impacts, but there is evidence of volcanic flows up there around some of them, I believe. There's still a lot to be worked out.

N: Do you feel that the analyses of the moon rocks will make any difference in our understanding of the sort of formations we find on earth?

McL: It's rather hard to say. But it is surely important new evidence. There's just a wealth of new knowledge, and new information coming. Surprising stuff. From the scientific standpoint moon exploration is a most valuable and exciting thing and I think it's a very good way to spend money. The returns from it are hard to assess right now but they will have very great impact on our thinking. Just the development of the technology of getting to the moon was wonderful training for a lot of people--engineers, scientists, computer technologists and a variety of skillful workers. Perfection of instrumentation was an example. To have people who can do that is a tremendous national asset.

N: I take it you would be pleased to see further space exploration?

McL: I would. I think it's a good thing to do. The space laboratory in particular seems important to me. Far more effective than spending the billions on some of the very poorly thought-out schemes dealing with poverty that do more harm than good.

Some Newer Developments in Geology

N: Is it your feeling that geology is still a developing science?

McL: Oh yes. Geology has had a perfectly amazing development in the last ten years or so. I think there was a period of relative stagnation in geology perhaps over the decades of 1940-60 when so much was happening in physics. More recently biology has become a particularly exciting field that is attracting bright young people. The physicists and biologists I am sure still feel that they are overwhelmingly the intellectual leaders of science, the high priests of science.

But in the last ten years, some of the new concepts such as the drifting of continents, and the techniques of obtaining evidence from the sea floor and the depths of the earth have started a wealth of exciting

McL: new thinking in geology. So geology has taken off again. And a lot of it has important bearing on aspects of geology related to the origin of metalliferous ore deposits. I don't think there has been any big breakthrough in theory in those fields, but there is a lot of stimulating new thinking. There has been some very fine work done and many important discoveries have been made. It's a field that's just full of challenge. I think we'll attract our share of brilliant men in the future. Not in numbers, perhaps, but we don't really need numbers, we need men with rather unique qualifications.

There is always competition in science, around the universities, to attract the finest people in your field. Physics has had its innings. Physics and for a while mathematics were getting the most brilliant minds--no doubt of that--and I think for awhile geology was rather low on the list. Biology seems to be having its day now, which is fine. And geology is surely coming back.

We need however, a combination of talents. Skill in the laboratory and in mathematical approaches isn't enough. In geology it has to be supplemented with ability to see things in the field and a love for exploration. I sometimes think our approach develops men with more wisdom and human understanding than the more confined life in laboratories and libraries does.

N: So you would perhaps suggest to up-and-coming young men who are very brilliant that geology is still a promising science?

McL: Indeed I would. It is really a very promising field and an enjoyable one if a person likes the type of life--especially the field work--that you have to do in geology. It may not be the fundamental sort of science that perhaps physics, chemistry or biology is. But, they are part of it too in the application of those sciences to specific problems of the earth.

If one is interested in the historical approach, geology certainly is a field which should excite him. Of course the problems of the earth have to be approached through physics and chemistry, and to a lesser extent, biology. Well, not to a lesser extent, for the origin and development of life on the earth is surely a most fascinating study. The geological approach is really an extension of history, or perhaps it would be better to say that human history is the latest, very short, extension of geologic history.

N: Yes, it all seems to come to a focus very nicely. You were speaking earlier of drifting continents, by which I understand you to mean a very long time span, but does this apply to earthquake problems as well?

McL: Yes, very much. When I was at Harvard, in my late student days and early days on the faculty, the theory of continental drift had really

McL: just been proposed in a book by an Austrian, Alfred Wegener. It was regarded as an exciting idea but a very wild one. He was largely concerned just with matching up South America and Africa, and North America and Europe.

He pointed out the correspondence between geological formations in the two land masses. Now there's an extraordinary amount of additional evidence suggesting that the two continents had been together and had gradually drifted apart, but no one then could see any reason for it, or any definite evidence except the matching of shapes and of fossil bearing rocks.

With the exploration of the sea floor, and the advances in oceanography, the nature of the mid-Atlantic ridge was gradually worked out, and now it is definitely established that there is a spreading of the earth's crust from that long ridge. It's a peculiar feature with something like a dropped key-stone in the middle.

As you move out from that ridge, the volcanic rocks and the sediments get progressively older. The younger ones are close to the ridge. By careful and precise measurements--it simply couldn't have been done twenty years ago--they are establishing that these ridges are great cracks in the earth from which the spreading has occurred.

It's not only in the Atlantic now but in the Pacific. Another line of evidence is from seismological work that has revealed an extraordinary distribution of earthquakes along these structures. On this coast, instead of having a ridge way out in the Pacific, we have one close to us. We're right on one of these zones. The coastal area of California is cracked and sheared from movements related to a similar belt in the Pacific--not quite like the mid-Atlantic ridge but clearly a mobile zone. We're living right on it. It goes right up the west coast.

N: Is this the Hayward fault?

McL: Oh, that's just a little detail, a local feature of the major zone that goes all the way around Alaska and all the way along the western margin of South America. The Hayward fault and the San Andreas are details in that great mobile zone. If you look at maps showing distributions of earthquakes you can see them clustered along these particular zones, both along the mid-Atlantic ridge and along its Pacific counterpart. That's leading to a lot of new thinking and interpretation of geological history, which has made geology a very new, stimulating science.

N: This kind of movement and opening up is not necessarily volcanic in origin?

McL: Volcanic action is one aspect of it.

N: It gives one the feeling that the earth isn't really quite as stable as

N: one would like.

McL: Oh, it's not really. We really are just on a little thin skin around a rather hot interior.

N: When there is volcanic action, is there usually metal in the magma?

McL: No, at least not in commercial concentrations. The molten material, of course, has a lot of metal in it. The black minerals all have a high iron content. There's a large range of metals but the scarce metals--copper, lead, zinc, gold and silver--are very, very scarce.

Some rather involved geological processes of concentration, you might say, are needed to segregate the metals and create ore bodies. As magmas cool slowly in depth in the earth, you may get concentrations of metals high enough to create deposits of what is now a commercial ore. An ore body by definition is a deposit of minerals in which the metallic content is high enough to make it profitable to mine and extract the metal, or at least to justify some hope that you can do this.

N: What are the major problems that you see practitioners of geology dealing with, let's say in the next ten to twenty years? Are they going to be as interested in finding new mines, or will they be more interested in the whole theory of earth movement?

McL: There will be people who will primarily be interested in finding new mines and trying to explain why these deposits are where they are and how we go about finding them. There surely will be people who will have a dominant interest in such work, some for the scientific satisfactions it offers and others for the practical results.

But there are others whose entire interest is in purely scientific aspects of geology with no concern whatever about its practical application to mining or to any other useful purposes. Probably most volcanologists, for example, are not concerned about the relationship their work might have to ore deposits.

And then there are seismologists who give their entire attention to the measurement and interpretation of phenomena related to earthquakes without much thought about applications to the design of buildings or the use of their techniques in the search for oil-bearing structures.

Demand for Metals

N: Can we revert briefly to the discussion of metals? The question of synthesizing metals or finding other metals for different uses--is this something that seems to be a logical development? Do you think, for

N: example, the demand for copper or gold will remain?

McL: I think the demand is always going to remain, but the market is always going to be a competitive one. At certain prices, the substitutions would come into play. If the price of copper, let's say, were to double in relation to other metals or similar commodities, substitutes would be found for some purposes now served by copper. Or double the price of zinc, and more plastics would be used. For some purposes, however, the properties of a specific metal make it unique.

A higher price tends to promote efficiency in the use of a metal, but it doesn't end the use. You can't imagine today the electrical industry functioning without copper. It's the basic conductor that's used in all motors and so on, and yet on the other hand, at a particular price level, aluminum displaced copper in transmissions lines. This was years ago.

The great transmission lines today are mostly reinforced aluminum cables, not copper cables. This was a matter of price. Either one would serve. Prices as well as specific properties are governing considerations. Silver is the best conductor of electricity of the metals but on account of its high cost it is not likely to compete with copper as electrical equipment.

So there are certain things that a metal can do that no other element can do, but then there are other services in which a metal is used for a purpose that another substance could meet perfectly well. That is, you don't have to have brass here [indicationg the base of a floor lamp]. You could use plastic perfectly well for that. If the metal became too expensive, it wouldn't be used.

I see a shift, a constant change in the use of metals, but I don't see that metals are ever going to be replaced by any of the new developments. They will undoubtedly be used more efficiently, more wisely as they become scarcer. As ore deposits, the ones we know today, are exhausted, we'll have to turn to lower and lower grade sources to supply the metals. It really means, in all probability, that the price of metals will gradually go up in relation to other things when it takes more energy to recover them from leaner material. Then that will enforce economies in the use; the metals will be used more exclusively for the things they are uniquely suited for.

Gold is an example. A very big industrial use of gold is developing now, with gold's particular properties such as resistance to corrosion, chemical action and tarnish, its malleability and ductility and its reflectivity. There's a growing market for gold in electronics. Platinum would probably do as well for some purposes, but not all of them, and platinum now is more costly than gold.

N: Do you feel that an increasing specialization is likely?

McL: Yes. It's a constant shift. It's a competitive market. As a material gets higher and higher priced, it will be used with greater care and efficiency, but I think metals will always be used.

XVI RESEARCH AND OTHER ASPECTS OF THE ACADEMIC WORLD

N: I'm intrigued by something you said earlier concerning Professor Graton's ability to get ahead with his pure science while other people were getting out of the research what they needed in a very practical sense.

McL: Yes, yes...and he really combined teaching and research most effectively. I'm inclined to think, in his own mind, he never worried about the distinction. Students went to him because he was both a teacher and a leader in research. I think those are the people who are particularly valuable to a University, not the people who are just burying themselves in research; turning their backs on teaching, but people who feel that teaching and research are intimately associated. Graton was one of those.

I think we've had plenty of people like that in Berkeley too. Joel Hildebrand probably would be the outstanding example of that happy combination; just a totally different sort of person from a professor who ways, "I must have my research. It's so important in my record". Such a man is likely to bury himself in some pedantic little job.

I think that a person like Graton was constantly seeing things he didn't understand which challenged him to devise ways and means to find out what they meant. In those days, during most of his life, the academic world wasn't rolling in money the way it has been for the last ten or fifteen years. He really had to go out and get financing.

The National Science Board and the Foundation

N: You're thinking particularly of research grants, that sort of thing?

McL: When I was appointed to the National Science Board, when it was established in 1950, Congress had limited the maximum appropriation to $15 million a year.

N: For the whole country?

McL: For the whole National Science Foundation which was to have the responsibility of providing financial support for pure research. Now the annual appropriation exceeds $100 million and everybody is complaining how strapped he is. Yet, 30 years ago, a person like Graton supported his field and laboratory work with very modest sums of money.

Of course, research these days has become far more costly and support for it on a truly major scale is essential if a nation is going to hold its own or survive in this dangerously competitive world. But I feel too that research ought to be confined to those who can do it well and not be spread too widely in academic institutions.

N: Do you feel that various industries are now willing to finance research projects as they once did?

McL: Well, there's a great variation. The mining industry hasn't been noted for its generosity in supporting research. A few companies do to some extent, among which the International Nickel Company is outstanding. Companies such as the American Telephone and Telegraph and General Electric of course have immense research laboratories of their own. They have been generous also in supporting work at the universities. It may happen that more of these companies, the very great ones, are going to turn to their own research laboratories rather than to expose themselves to the uncertainties of what goes on at the American universities these days--and the restrictions imposed on the work that they may want to have done.

N: Following this train of thought, perhaps more people will tend to do in their careers what you have done, which is to go both to industry and to the academic world?

McL: Yes, but I was thinking of people who were primarily scientists. If I had felt that I was really a first rate scientist, I probably would never have left Harvard.

But it is surprising to think of the difference in those early days when Graton and the other scientists, the physicists, even Ernest Lawrence, were accomplishing so much with what would seem now a pittance in dollars. Now, because there is a curtailment in the expenditures, you'd think we were poverty-stricken around the universities, in research.

N: You think it's still possible to make very great advances with very small expenditures?

McL: I think it is, if people are brilliant enough and have a will to do it. Well, there are some fields, of course, in which the further research has become so extremely costly. Nuclear physics, for example. A sceptic

McL: might wonder if they hadn't perhaps reached a point of diminishing returns, at least per dollar spent.

N: I wonder sometimes too, whether there's an analogy between scientific discoveries and what people used to say about bridges: all the easy ones have been built. Maybe just the hard ones remain to be made.

McL: That's certainly true. To carry on new research, and to get to the firing line, you might say, in nuclear physics, just requires more and more of extraordinarily costly instruments--linear accelerators and the like--that run into tens and hundreds of millions.

N: Yes, Edison with his bent pins...

McL: Yes, but I know you can't quite do that any more.

N: Can we talk a little more about the National Science Board and the National Science Foundation?

McL: Yes. That was a very interesting and important assignment. I was one of the charter members of that board. The National Science Foundation was created by Congress, really stimulated by Vannevar Bush and Conant, to create an arm of the government that would be concerned with support of basic research in this country. It was apparent during the war that basic research was a very critical need.

N: I note that you were appointed by Truman and reappointed by Eisenhower.

McL: Yes, I was appointed to a four-year term by Truman--one of the original appointments. The full term was six years, and then when my short term ran out, I was appointed to a full six-year term by President Eisenhower which gave me ten years on that board. It was very interesting the way it grew.

You see, before that, the Department of Defense, and the Navy especially, had really made very generous allotments to projects of purely scientific character. They were under a bit of criticism for it from some political personages, but they felt that science (really fundamental basic science) is essential for defense. The Navy particularly kept such government support alive in that interim, from the end of the war to the creation of the National Science Foundation.

N: And the Navy picked up that responsibility.

McL: In that interval it was the Navy especially. Then the Science Foundation was created to move into that field, but in the first act, the appropriation was limited to $15 million, which shows how unrealistically low the sights had been set.

N: Do you have the impression there is less funding for pure scientific research now than there has been?

McL: Oh. Far more now than there was then. But it seems to me so typical of the American system. We go to extremes and then have to begin to cut down a little bit. When money is plentiful there's apt to be extravagance and lack of care in appropriating it. Every professor wants his research grant, whether he's a good research man or not, and he generally gets it. Which, I am afraid has led to some poor research.

N: Is there no evaluation?

McL: Oh, very careful evaluation, but still in affluent years a pattern builds up. Everybody tries to get into the act. I think the present period of a little tightening of the screws and curtailment of appropriations all through the world of science and education is not too bad.

N: How would you like to see the regulations employed in scientific research?

McL: Oh, I think the procedures of the National Science Foundation are excellent. The Foundation by all means should continue to grow, but it's not a bad thing to have a little tightening of the screws for a while and to weed out some activities that are not too impressive.

To go back to the beginning of the National Science Foundation, however, the feeling was that it should not be an organization that was in any way directing science. It endeavored to confine its appropriations, at least in the early years, to projects proposed by scientists themselves. It of course had to evaluate competing projects and requests for appropriations. But instead of having decisions made by a little bureaucratic group, competent advisory committees were established in every field--very competent people--who really made the selections and recommendations that the staff and director followed and submitted to the Board for approval.

But no matter how much money you have, where money is being given away, you get more requests than can be granted. So there will always have to be decisions--you cut off here or you cut off there. If you get more money, more projects will probably be submitted and approved. With less restricted selectivity, there might be some danger of a decline in quality.

Perhaps at times too much money has been provided for some fields, though none of us ever thinks so if it happens to be his field. A tightening of expenditures these days all along the line is needed in America, I am afraid, if we are ever going to end the deficits that inevitably lead to inflation. A government simply cannot go on year after year running deficits as we've been doing and meeting them by expanding the money supply without money depreciating in value. If it were a company,

McL: it would go broke and be bankrupt.

The government doesn't do that. It issues bonds. If the bonds are not fully taken up by the people, the Federal Reserve Bank acquires them and uses them to create credit which becomes the equivalent of money. The government gets the means to go on spending, which it generally does.

We are no longer on a gold standard. We are on a debt standard. Debt is monetized and there is little control over the quantity of money that is created. As it increases beyond proper limits, the money itself becomes less valuable. I'm no economist, but I think that is the basic cause of inflation. Reduction of governmental expenditures is needed to control it--and even the scientific bureaus should cooperate in the effort at least to the extent of eliminating unproductive work.

The labor unions and the corporations are naturally trying to protect themselves against the losses caused by inflation. And college professors are trying too. They have averaged close to five percent increase in salary over the last few years. On the whole they haven't done badly, for five percent is a little bit ahead of the rate of inflation, at least it was until recently.

But this effort of groups to protect themselves is simply a result of inflation. They tend to magnify its effects, but they are not the basic cause. The terrifying thing is that inflation is likely to follow an exponential curve and if allowed to continue unchecked may take off as it did in France and Germany, which is a rather frightening thought.

N: Yes. Well, certainly it has so many unknowns. Everyone has a pronouncement.

McL: Everybody who is involved in benefitting from government expenditures yells and howls when there's a curtailment. Just as the scientists are saying now, "This is dreadful. You're wrecking the economy." I think we could even put the screws on them a little bit to be a bit more careful in their expenditures.

N: Of course there are some things that may be questionable, for example, the cessation of certain cancer research projects. It's hard, I suppose, at times to know whether the right ones are closing down.

McL: I know. But I have misgivings about our feeling in America, "All you have to do is appropriate money." You've got to get brains. Now, I've heard some people say that there's more money available than brains in cancer research.

N: [Laughter] Well, that's a very telling remark.

McL: I think that's a good example of the danger of a field which certainly

McL: has been very popular. I read in the paper just yesterday of a proposal to put many billions into cancer research, saying "See what we did when we developed the atomic bomb under emergency conditions. Why can't you do the same in cancer research?" Well, I just don't think it works that way.

N: You'd like the evidence of brains first?

McL: Brains first. And in this undisciplined age too many able young people are getting distracted and going through the very important period of their youth without getting the good, disciplinary training in fundamentals of science and mathematics that they ought to have. It may be a very bad thing for us. Without such preparation, good research is hard to come by.

N: One sort of hopes that there are always some competent people who tend to pull us through.

McL: Oh, there undoubtedly will be.

N: There are talented people?

McL: Oh, many, of course. There's no difference between this generation and others as far as the percentage of talent is concerned. I don't think they're more talented or less talented. They've had much greater opportunities than any other generation. They have a greater base to build on. That seems to frustrate some of them. It would be a sad thing if it frustrates some of the talented people. And it might.

N: Yes, you don't like to see the waste. I was thinking back again to your first entry into the National Science Board and you were saying Vannevar Bush and Conant were interested in it particularly. Do you remember others?

McL: Lee duBridge was one of the members. Robert Loeb, the brother of Berkeley's Leonard Loeb and the son of Jacques Loeb, was one of the most effective members in his quiet way. I had known him as a boy when Leonard and I were in Berkeley High School, and it was wonderful to renew our old friendship.

N: Did you start with sort of a commitment that this board should be established and go forward?

McL: Surely; everyone was enthusiastic about it. The National Science Board was created by act of Congress as the governing board of the Foundation, more or less like the Regents of the University, though perhaps not quite as powerful. The first problem was to select a director, and through him to build up a professional staff, and then as it gradually evolved, to establish policies. There were extremely knowledgeable people, recognized

McL: leaders on the board, though that generalization doesn't include me. Dean Potter from Purdue and I were the two engineers on the board at the start. But most of them were truly distinguished scientists. There was a pretty clear feeling about how the Foundation should proceed, not as an over-all czar of science, but really in a good free enterprise way to let the scientists themselves formulate their programs and submit their requests. This was really in accord with the way science has functioned in America.

N: Did you at any time establish priorities?

McL: Gradually, but in a limited way, largely through budgets. It was interesting watching the procedures grow and policies grow. Alan Waterman, who was the first director, was a very wise person. He was a physicist of distinction, but he also had long experience in Washington and government activities and he knew his way around, which was an essential thing at the start of the National Science Board--and the Foundation. I'm sure that if the board had made the mistake of selecting an empire builder, he could have done a lot of damage and aroused a lot of opposition to the Foundation.

The policies have gradually been modified, as they should be, but I think it has been very wise to keep the Foundation from being in any way a dictator of science. It shouldn't be.

Another interesting man on that board was Paul Klopstek who was one of Alan Waterman's aides. He was, I think, his ranking staff member who had a lot to do with the development of policy in the early stages.

N: By the nature of the leadership, was there more interest in physics perhaps, than in other sciences?

McL: No I don't think so, because at that time the Atomic Energy Commission was in being, and it was putting a lot of emphasis on pure research in nuclear physics. But nevertheless, gradually some of the big things, such as the Stanford accelerator, were financed through the Science Foundation.

But on the other hand, the Los Alamos Laboratory and the Radiation Laboratory here (at Berkeley), which are tremendous laboratories of basic research, still continue to be financed and directed by the Atomic Energy Commission. Some great new things came up under the Science Foundation. There was good cooperation, it seemed to me.

N: At the moment, does it seem to you then that the National Science Foundation has moved into innovative fields more than the Atomic Energy Commission has done?

McL: Well, it should. The Atomic Energy Commission's assignment was really

McL: a very directed assignment, whereas the National Science Foundation's assignment is a broad one that includes all science. At the start, it was assumed that its primary concern was the natural sciences. Its range was later enlarged to include certain of the so-called social sciences, which to my prejudiced way of thinking was a mistake. That reveals my prejudices.

N: You're so candid about it. You don't hide it at all. [Laughter]

McL: Earlier, while I was on that board, there was a lot of pressure to include sociology, but it was some time before it was approved. Anthropology got in under the tent, of course. If you consider anthropology as an extension of geology, I think it's a respectable science. But when it drifts into patterns typical of the social fields, my respect for it declines.

N: I want to be sure to get a more complete list of your service on the boards and commissions.

McL: Of those boards the National Science Board was really the most distinguished national appointment I ever had. It was really a very interesting board.

N: It had all these wide-ranging intellects on it.

McL: Yes. Yes, it had a great range. Jim Conant is an old, old friend of mine from Harvard days; long before he was president of Harvard. And I've known Lee duBridge a long time. He's a great person.

N: Are there any other of these activities that I have not asked you about?

McL: I don't think so. Not of the semi-government ones. Of course, we have talked about the Regents. You could say that was the service I enjoyed most and was surely the most important appointment I ever had.

Faculty Promotion and Tenure

N: As a former Regent, do you have some views on faculty tenure as you have seen it?

McL: I do think that we've gone through a period of ten or fifteen years, in American education, in which there has been such expansion that the academic faculties have been built up with many people who, in a more competitive world, would not have gained protection with tenure quite as easily. Some deadwood is probably unavoidable, but in such times it is more difficult to avoid it.

N: If we could do anything about it now, would you like to see some change in the tenure situation? A longer probationary period, or some other change?

McL: I think a period of practically six years, two assistant professorship appointments, is a reasonable one. But now you hear the papers and the radicals all say a young professor is being dismissed, at the end of his assistant professorship. He's not. He's simply not being rehired. It ought to be established and more generally recognized, as far as the University goes, that it is not possible to grant tenure to all of the assistant professors when their term is completed. Not all can or should go on to permanent rank in the University--even when qualified. A selection has to be made for there are ordinarily not enough higher posts open.

N: Are the assistant professorship appointments three years?

McL: Yes. And they're supposed to be term appointments with no guarantee of continuity. But human nature being what it is, it's an awfully hard thing to tell a man, "Sorry, but we can't retain you." Harvard's done that rather ruthlessly for years but in the old days it was assumed rather arrogantly that no one who had been an assistant professor at Harvard would have any trouble getting a job elsewhere. Well, to an extent that was true.

And, of course, an assistant professor at Berkeley ought to be in demand also. But the number of permanent places at Harvard and the number of permanent places at Berkeley isn't enough for everybody who has an assistant professorship.

N: So there really is a pyramid operating, more assistants and fewer above them.

McL: Yes, for in general a broad base is needed. And in the period when the University was expanding and new campuses were being staffed, there were unusual numbers of positions to be filled. The state colleges were growing too. The entire academic world was growing. So practically, we went through a period when nearly everybody who had gone up through the assistant professor ranks was easily getting a job. Now when available positions have been filled with tenured staff, the opportunities are restricted and many well qualified people are necessarily passed over.

Overdoing the Ph.D.

N: Do you have the impression that we really are over-producing Ph.D.'s in the various fields?

McL: I rather think so. I'm a bit sceptical about the Ph.D. technique as the

McL: best preparation in some fields. The Ph.D. technique grew up in science where it was closely and very effectively tied into research. It was very closely related to progress in science and to teaching, but I think when the same procedures are adopted in some of the other fields, let's say, English literature or sociology they can become awfully pedantic, and really uncreative. I'm not at all sure it's the best general technique. It's a good technique but I think you can overdo it.

N: Perhaps a different system in different fields might make more sense.

McL: I think so. The Ph.D. is being pushed very strongly in engineering, for example but I'd rather see more effort to win respect in the engineering field for a more professional degree--one that would be more like the M.D. degree. More of a professional degree, and less like a research degree.

N: Could the same thing be accomplished by making it a master's degree or do you see something beyond that level?

McL: Well there's a lot of discussion about that. I think there's room in the engineering sciences for a Master of Arts or a Master of Science and a Ph.D., and there's an important place of a student and professor oriented toward research concerned with engineering needs. But I also feel that a major part of the effort of most engineering schools should be in training people for professional competence, rather than research ability.

N: It is fascinating to hear you say this because there is a lot of such discussion, as you know, in many fields.

McL: Oh, yes. Here in Berkeley we do have a brilliant engineering faculty and I think the emphasis has been lately very much on the Ph.D. approach toward preparation for careers in engineering.

N: Do they seem to feel the prestige lies at the Ph.D. level?

McL: Yes. And, if it's at only a few institutions, it may be justified. But it can be overdone. All the state colleges these days seem to want the prestige that they feel goes with the Ph.D. degree, which I think is ridiculous. You don't employ people on the outside really because they have a Ph.D. It's whether or not they are good professionals, with competence to handle a job assigned to them. It may be technical design, operational or possibly research. Training of the Ph.D. type of course might be helpful in the latter.

But in most engineering work interest really tends to focus on a professional competence and it should be recognized by a professional degree. But not one without the other, by any means, just as in the medical schools. The bulk of the people getting the M.D. degree should

McL: be professionals, and yet every medical school certainly must, to be worthy of being a great medical school, carry on important and needed research and it should turn out many people who are of Ph.D. quality in the medical sciences who are really research scholars--productive scholars in the medical sciences. I think you need both. However, a productive scientist in medical research wouldn't necessarily be the best professional in the field of medicine.

N: So in a sense you're drawing a distinction between the practice specialists and the research specialists?

McL: Yes, yes. I like the word professional.

N: Professional specialists.

McL: Very competent, aware of what's going on in the sciences and quite able to use it, and yet not involved in some very specialized, intricate piece of research to advance knowledge in some particular way.

N: Would this suggest perhaps, that people with professional competence can also be very good teachers?

Mc: Oh yes. We were talking about that earlier. The best of them are good at both, but an institution can throw its emphasis one way or the other. Some scholarly Ph.D. types I've known can be awfully boring and narrow people--but not generally those who are involved in practice as well as research.

I think you have to have some and I think you probably always will, but I don't think we should make the production of Ph.D.s the dominant objective of all departments and schools.

N: Do you have any view on the suggestion that perhaps, sort of resuscitating the master's degree in certain fields might be desirable?

McL: I think so. I think a master's degree might be strengthened and be regarded really as a respectable professional degree. If a person is going to be a teacher, let's say, of English literature, I should think a master's degree in that field would be suitable.

N: The people in city planning apparently find that a master's in city planning is good professionally.

McL: I think the master's degree could very well be strengthened and made a terminal degree for many people. And a degree that commands respect.

N: Do you feel this is possible within the University itself?

McL: I think so. I think you'd have to have a somewhat different attitude

McL: towards the master's degree than the attitude that prevails now. It's largely an attitude created by faculty and in the way it's reflected in the students too. The master's degree shouldn't be just a casual degree on the way to the doctorate.

I remember as a graduate student at Harvard most of us acquired our M.A. degrees on the way, but it was almost a matter of indifference whether you took it or not--perhaps determined by whether or not you had the $20 fee. Of course if a student wasn't encouraged to come back that was another story. Then it would would be considered a good terminal degree at least by the recipient.

Observations Concerning Regents

N: Perhaps you saw in the paper today a proposal that students have some voice on the Board of Regents? Have you followed this discussion?

McL: That's come up now and again. I think they should definitely not have a voice on the Regents. That is, students are students, young, immature people. They're not equipped, I think, to handle the sort of problems that come up before the Regents. They can play at it but they're not yet qualified for such positions. I think the Regents and the faculty certainly should listen to students but that's very different from putting students in positions of authority. I think you gradually grow into positions of authority. You don't simply hand them to immature people.

N: Speaking of Regents and the sorts of decisions they must make, do you have any view on the presence of ex-officio members?

McL: Yes. I think that the political element should be represented on the Regents. Certainly, not in a dominant way, but it's a very helpful thing to have at least three or perhaps four, ex-officios on the board, who have at first hand the opportunity to acquire direct knowledge of the problems of the University.

N: Do you see their main role as one of learning about the University, or trying to assert their point of view?

McL: Well, at first at least it should be learning. Of course you have the danger that those people will try to use their position on the Regents to further political ambitions or to put political pressure on the University. I don't think that's been possible very much in the past and then I don't think it's likely to be possible even today. You have the speaker of the Assembly in one party and the Governor and the Lt. Governor in another. I think it's a good thing to have them there and to be exposed to the criticism of the other Regents. That is, they're only a small number compared with the appointed Regents, the sixteen appointed Regents.

McL: Let's see, there are only five ex-officios: the governor, the lieutenant governor, speaker of the Assembly, superintendent of public instruction, and the director of the agricultural board. They are the only really political figures. The president of the Mechanics' Institute is also an ex-officio member, but he surely is not political. There's apt to be a lot of diversity among them. I remember during the Oath controversy, you had Governor Earl Warren very much on the side of the faculty and Goodwin Knight, the Lieutenant Governor, very much on the other side.

N: Yes, that's right. That's very interesting. I hadn't thought of it that way.

McL: So the division wasn't along political lines. When I was on the Regents, I think it's quite extraordinary how little division there was on political lines. Whether that's true or not now I don't know. I'm not among them now, but I'm quite sure there was no such division in the days when I was on the board. There were liberal Democrats and conservative Democrats. Ed Pauley's a Democrat; Ellie Heller is a Democrat; and that's hardly to say they saw eye to eye. [Laughter] And then Norton Simon's a Republican, strangely enough.

N: You are putting your finger on some of the instances where party labels don't necessarily make much difference. You've also heard, I'm sure, some of the discussions about the possibility of changing the term of Regents or the question of whether Regents should be reappointed and so on. Do you have some thoughts on that?

McL: I rather think the long term, by and large, is better. Now and then you get a poor Regent who for a time may seem a bit awful. But most of them, if they're on long enough, learn enough to be useful. I would, perhaps, raise some questions about reappointment. I think making it practically a life-long term is getting rather absurd. I think that a sixteen-year term without reappointment would be probably a very good thing.

N: So two terms is...

McL: Is a long time, yes. Ed Pauley was on practically a lifetime. Governor Culbert Olson appointed him first. And Pauley was reappointed by several governors to successive terms. I would never question Ed Pauley's devotion to the University as he sees it. He's been a devoted Regent and a very helpful one at many critical times. I think his service on the board was one of the biggest things in his life.

N: As a matter of the practical operation of the Board of Regents in general, if a committee brings in a recommendation, is that normally accepted by the main body?

McL: It generally is. The procedure is that the chairman of the committee submits the report, and if a member of the committee or a member of the board

McL: doesn't agree with some part of it, he can ask to have that item brought up for separate consideration. If this occurs, the usual procedure is then for the chairman of the committee to move acceptance of the report, with the exception of such and such an item that will be brought up for discussion and separate action. Then at that time there will be special discussion on that point.

N: I thought of this really in connection with your observation that the ex-officio members were only twenty-five percent of the board, which is certainly true, but possibly, depending on what their committee assignments were, perhaps would that make a difference in their influence?

McL: Well, yes it would. The political members haven't been too attentive as committee workers though. They're busy people. It's been an annoying thing, I think, on the board, that there have been at least some Regents who don't like the committee system, and do not attend meetings when a matter is discussed in detail and who then bring up objections to some findings and use up hours of the board's time, discussing something that has been already considered carefully by the committee.

Our friend Norton Simon was a past master at doing that.

N: Perhaps he's addressing a different audience?

McL: Yes, it may be. But he didn't like the committee system and he wouldn't attend committee meetings and then he would, I think, use a shocking amount of the board's time on some particular thing that just happened to be of great concern to him, even though it had been thoroughly reviewed at a committee meeting he may have ignored.

XVII SOME PUBLIC POSTS

N: Let's see, to turn again to some of your other activities. You were listed as chairman of the National Mineral Advisory Council?

McL: Yes. That was a rather short-lived thing, and that was set up to get advice from the mining people dealing with minerals. I think that was for the Department of Interior. It wasn't too long-lived or effective.

N: They did seem to keep tapping you for so many of these groups. I'm not sure about the name of this one, but I have it as Committee on National Resources of the Commission on Organization of the Executive Branch of the Government.

Hoover Commission Recommendations and the Public Lands

McL: Oh, that was in connection with the Hoover Commission. That was one of the so-called task forces that was set up under the Hoover Commission. That was a very interesting committee. The one I served on dealt with problems related mostly to the Interior Department. It came up with a lot of good recommendations, that weren't adopted.

Modification of mining laws was discussed at great length there in that committee, and some rather drastic recommendations with regard to reorganization of the Department of the Interior were made. I think one was for a Department of Natural Resources, taking over a great many of the functions of Interior, and also taking over Forestry from Agriculture.

Those were two drastic recommendations--I remember rather well--probably too drastic to be practical at the time. I think very few of the recommendations of that Task Force were put into effect. The Hoover Commission accepted them though.

N: Now this relates, I'm assuming, to public lands.

McL: Yes, public lands, federal public lands.

N: What was the approach that you were concerned with? What did you hope would be accomplished?

McL: Well, I think a principal hope was a simplification and a clarification of the process by which a title to a mineral deposit could be obtained in public lands. We sought to simplify the, I think, archaic laws that now exist that go back to 1872, according to which discovery is a requirement for a valid mining claim and title must be preserved by performance of what is called assessment work (much of which may be and often is just wasted work).

Under the present law a claim on which you've done this assessment work, after you really find something, can be patented, which gives you practically a fee simple title to that land forever, if you pay taxes.

The definitions of what is discovery and what you have found are so vague, the validity of a claim depends just how the courts are going to interpret the various requirements. Fifty years ago it was very easy to get patented mineral claims on very scant discovery, and now it's almost impossible to patent a claim even though there is great presumption that the claim contains valuable ore.

There are certain types of ground on which it would be almost impossible today to get a mineral claim under strict interpretation of existing laws and rules and yet there might be prospects for ore in it that would justify costly exploration. Without getting some sort of title or rights to such land in advance, you would not take the high risks of mineral exploration.

N: So public lands, under certain circumstances, can pass into private hands?

McL: Oh yes. And under some conditions, quite properly so. The old laws still prevail. You can stake a claim, but you're supposed to make a "discovery," so-called, before it can be regarded as valid. Now what is a "discovery"? It's very vaguely defined.

Then there is another aspect of the law of 1872 that creates complications. It gives the miner the right to follow a vein or lode (without describing what a vein or lode is very clearly) down its inclination, down its dip, outside the sidelines of his claim. For example if there was a vein going along like this, and it was inclined like this (downward), you may claim the ore down to the depths of the earth between parallel planes through the two end lines.

N: But doesn't that interfere with somebody else's claim?

McL: If the ore goes under another claim, or intersects the extended extra-

McL: lateral rights of another prior claim, there is apt to be a conflict. It goes back to the oversimplified notion in the early days that most valuable ores were in veins and when a man found his vein that was his property for so many feet along its course and he had the right to follow it down into the earth as far as he could mine it.

It's an old, oversimplified concept of the rugged miner that's been abandoned in practically all countries of the world. But we still have it.

There's a most intricate body of law now grown up about it. Ores however are not generally found in simple tabular bodies. Even such veins split, and divide, they're faulted, they're offset, others intersect them. Who owns them? It's a lawyer's paradise. I don't think the lawyers want to give up that paradise. The law is still in effect.

N: Your task force was thinking to simplify...?

McL: Simplify that, yes. And eventually to insure that when a person had an ore body he would have a more secure title. But that came up against too many complicated interests, ranging from the prospector who wanted his old rights--he didn't want to give up that--to a mining company that had based a lot of its operations on what has become a rather stabilized ownership situation based on rights well established by the courts. So it's difficult, trying to make sweeping reforms.

Well, none of our recommendations, as far as I know, really went through at that time.

N: Oddly enough--perhaps you've seen this too--in recent days there has been some discussion again of laws concerning public lands.

McL: Yes, it has become a very live subject again. We do have leasing laws for most of the tabular deposits like potash, and coal and petroleum. They work pretty well, but those have never been applied in the mineral field. In fact there has been great opposition in the metal mining fraternity to titles based on leases simply because there is a great body of practice now built up on the other concept.

N: When you say "tabular deposit" what does it refer to?

McL: A bed.

N: I see. Then you spoke of taking Forestry away from Agriculture and putting it in the Department of Natural Resources. Would this increase logging activities?

NcL: Oh no. Not necessarily. I think that would simply mean that instead of being administered by the agriculturalists, the Department of Agriculture,

McL: it would be recognized as a natural resource.

N: It seems logical.

McL: It does seem logical, but there again you run up against those vested interests. I'm sure it was rather idealistic to think that it would ever be adopted.

N: There is something funny about fish and animals being under Interior.

McL: Yes, isn't it? [Laughter] I know. It's surprising how our government can function. Generally when a new department is built, the old ones are not terminated, so it's just piling more trouble on top of old troubles.

N: Do you foresee any rationalization of mining law in the future?

McL: I would doubt it.

Advisory Committee, U.S. Geological Survey

N: You are also listed as a member of the Advisory Committee to the U.S. Geological Survey.

McL: Yes. That was an interesting assignment. The committee has been allowed to disappear without being formally terminated. It was really instigated by Thomas B. Nolan who was director of the Geological Survey and I think it served a helpful purpose.

He assembled a small group of well-known geologists and others from both industry and the academic world who would meet a couple of times a year and spend a couple of days hearing what the survey was doing and discuss it with the heads of the different departments.

The committee reported directly to the Secretary of the Interior. I think the committee was probably most useful in smoothing out difficulties of the survey with the higher administration. It was a very interesting assignment because we were all anxious to have the survey maintained at its traditional high level, as independent as possible of changing political parties. Horace Albright (U.C. 1912) was on that committee. He's an old friend of mine.

N: You were in a position to learn a lot, I would think.

McL: Well, I think it helped Tom Nolan as director too, in reinforcing some of the things that he wanted to do. We were all very sympathetic to him,

McL: since he was a person we had very high respect for.

N: Were you involved in any consideration of earthquake hazard at that time?

McL: I don't think so. Not very much, except that the work being done in relation to earthquakes of course was often discussed. I don't think it had reached anything like the organization it has now. We did express some concern about the need to center such work in the survey, and to avoid costly duplications between competing agencies.

Always (and I suppose this was the infighting in Washington), whenever some popular new thing comes up, lots of people rush in avidly to get it in their department. Empire-building going on. Directors of the Geological Survey were constantly worried about poaching on what they regarded as their domain.

I think our committee was very sympathetic in trying to protect the Geological Survey's interests not simply because we had friends in the survey, but because it had a very talented staff and a very wonderful record. The survey handles offshore oil leases too, a terrific responsibility that involves far more than geological studies and discoveries.

N: Do you have some opinions about the offshore oil leases and the drilling?

McL: I have no particular opinions about it from a professional standpoint for I am not a petroleum engineer, but I feel strongly that the continental shelf is a source of oil that simply must be developed in our national interest. Our country's running out of oil, and it's a very great asset to have these really enormous resources of oil available in the offshore area.

The technology is extremely difficult. With all the precautions, there are likely to be some disasters once in a while in drilling. On the other hand, there again, I think the ecologists in their oppositions to off-shore drilling have been pretty extreme.

When something happens such as the Santa Barbara oil spill, there are wild statements about Santa Barbara Channel being turned into a Dead Sea and so on, everything being killed in it. The studies now indicate that the damage done really was very small. It was messy for a while. Very annoying, but it has all cleared up.

There's an article in this magazine Ocean that I was just reading last night. Quite an impartial committee made a report on the conditions in the Santa Barbara Channel. The most surprising aspect was the little damage.

It was also pointed out that long before any drilling, there were constant oil seeps in that channel anyway. It was a natural phenomenon.

McL: Of course that great blow-up was a very horrible and messy thing, but after a year the beaches were about as clean as they had been before it happened. An unpleasant event, but not a major disaster.

N: Before we conclude, I want to be sure to ask your secretary, Miss Guell, to give me a really complete list of all the various awards and honors that you're a little too modest to talk about. This is not to embarrass you, but because it's part of your record.

McL: Do you see that piece of plastic? That pattern is an atomic discharge inside the plastic cube. That was presented at the first birthday of Melvin Calvin's laboratory, you know, chemical biodynamics. My only connection with the laboratory was that I'd been very much interested in the designs with Michael Goodman. And Michael came down time and time again with his drawings, right in here, and talked about them.

If they could have done all that he wanted to do it could have been an even more beautiful structure. It's really a very nice one now, that round building.

So at the first anniversary, they had a birthday cake with one candle on it. There was a big gathering up there, everybody was having a good time, and then they said, "Read the inscription on the cake and here is this little present for you..." I was made an Honorary Graduand of the laboratory. I said, "Well, what's a graduand?" They said, "A graduand is a graduate student who has no hope for a degree but we don't want to get rid of him!" That's a pretty good description of my present status.

Transcriber: Helen Kratins
Final Typist: Marjorie Prince

APPENDIX I

BRIEF CAREER SUMMARY

NAME: Donald Hamilton McLaughlin

PRINCIPAL ACTIVITY: Mining Company Executive

PLACE OF BIRTH: San Francisco, California DATE OF BIRTH: December 15, 1891

FATHER'S NAME: William Henry McLaughlin MOTHER'S NAME: Katherine Hamilton

EDUCATION:

Berkeley High School 1905-1909

University of California 1910-1914 B. S.

Harvard University 1914-1917

1915 A. M.
1917 Ph. D.

Honorary Degrees:

South Dakota School of Mines & Technology
D. Engin. 1950

Michigan College of Mines
D. Engin. 1950

Montana School of Mines
D. Engin. 1955

Colorado School of Mines
D. Engin. 1955

University of California (Berkeley)
LLD 1966

MARRIED:

	Date of Marriage:
Eleanor Eckhard (div.)	September 12, 1925
Sylvia Cranmer	December 29, 1948

CHILDREN:

Donald H. McLaughlin, Jr.
July 15, 1926

Charles Capen McLaughlin
January 20, 1928

Jean Katherine McLaughlin
February 16, 1953

George Cranmer McLaughlin
May 16, 1955

BRIEF CAREER SUMMARY:

Secondary Enrichment Investigation (Harvard) Geologist, 1915-1917
63rd U. S. Infantry Lieutenant, 1917-1919

Harvard University

Professor of Mining Engineering	1925-1935
Professor of Mining Geology	1935-1941
Chairman, Division of Geological Sciences	1933-1941
Chairman, Department of Geology & Geography	1932-1941

University of California, Berkeley

Professor of Mining Engineering	1941-1943
Dean, College of Mining	1941-1942
Dean, College of Engineering	1942-1943
Professor of Mining, Emeritus	1966-

Cerro de Pasco Copper Corporation

Geologist at Cerro de Pasco	1919-1921
Chief Geologist (La Oroya)	1921-1925
Vice President	1943-1945
General Manager in Peru	1944-1945

Homestake Mining Company

Consulting Geologist	1926-1944
President and Chief Executive Officer	1944-1961
Chairman of the Board	1961-1970
(Chief Executive Officer)	1961-1962
Honorary Chairman and Chairman of the Executive Committee	1970-

PRINCIPAL CONSULTING WORK: (In Mining Geology)

Homestake Mining Company	1926-1944
San Luis Mining Company	1927-1948
Case Pomeroy & Co.	1932-1937
International Nickel Co. of Canada	1967-1974

DIRECTORSHIPS:

Homestake Mining Company	1943-
President	1944-1961
Chairman	1961-1970
Honorary Chairman	1970-
Chairman, Executive Committee	1970-
Cerro de Pasco Copper Corp.	1943-1961
The Dorr Company	1945-1955
San Luis Mining Company	1944-
Vice President	1948-1973

DIRECTORSHIPS: (continued)

Empire Trust Company	1945-1959
American Trust Company	1947-1960
The Bunker Hill Company	1949-1968
Triumph Mining Company	1947-
International Nickel Co. of Canada, Limited	1948-1973
Member, Advisory Committee	1972-
Wells Fargo Bank, Advisory	1960-1968
Emeritus	1968-
Western Airlines	1954-1966
Emeritus	1966-

OTHER ACTIVITIES:

Regent, University of California 1951-1966
Chairman of the Board 1958-1960
Committee on Educational Policy (Chairman)
Committee on Grounds and Buildings (Chairman)

Coordinating Council for Higher Education (State of California)
Member 1960-1966

National Science Board, National Science Foundation
Member 1950-1960

U. S. Geological Survey, Advisory Committee 1950-1965

Chairman, Harvard Foundation for Research 1954-1959

Member of Council, Harvard Alumni Association 1946-1949

Atomic Energy Commission

Chairman, Advisory Committee on Raw Materials 1947-1952
Advisory Committee on Plowshare Projects 1959-1972

Trustee-Council on Economic Development 1960-1962

Trustee-San Francisco Conservatory of Music 1964-1973

Director, Exploratorium, Palace of Arts and Sciences, San Francisco 1969-

Member of Council, California Alumni Association, Berkeley 1971-

AWARDS:

Rand Metal (American Institute of Mining, Metallurgical & Petroleum Engineers) Awarded in 1961 (Gold Medal)

AWARDS: (continued)

Ambrose Monell Medal & Prize (Gold medal and $20,000)
Awarded May, 1964, by Columbia University

Resolution of Commendation, Assembly, California Legislature, 1966

Centennial Year Honors, University of California, Santa Cruz, 1968

Centennial Year Honors, University of California, Berkeley, 1968

Award for Contributions to Mining Industry, Northwest Mining Assoc., 1967

The Golden Plate Award, American Academy of Achievement, 1972

MEMBERSHIPS IN HONORARY, PROFESSIONAL AND SOCIAL ORGANIZATIONS:

Phi Beta Kappa, Sigma Xi, Tau Beta Pi, Kappa Sigma, Golden Bear (U. C. Berkeley); American Academy of Arts & Sciences, (Councillor 1939-1942); Member of American Institute of Mining, Metallurgical & Petroleum Engineers, 1914- ; (President 1950 - hon. member 1958); Fellow Geological Society of America, (Councillor 1934-1936); Society of Economic Geologists (President 1938); Mining & Metallurgical Society of America (President 1953); Council on Foreign Relations (New York); Sociedad Geologica del Peru (hon. member).

CLUBS:

Pacific Union, Bohemian, Engineers (San Francisco)

University, Century (New York)

Cosmos (Washington)

OFFICE: 650 California Street (Homestake Mining Company)
San Francisco, California 94108

HOME: 1450 Hawthorne Terrace
Berkeley, California 94708

APPENDIX II

LIST OF SPEECHES

LIST OF SPEECHES

UNIVERSITY OF CALIFORNIA

Contrasts in Objectives in Supporting of Research	August 31, 1953
Channel City Club, Santa Barbara	August 31, 1954
Dedication of Western Data Processing Center, UCLA	January 1, 1959
Dedication of the 120 Inch Telescope at Lick Observatory	July, 1959
Comments on Educational Policy	March 26, 1957
Dedication of Plaque to Wm. G. Donald	March 15, 1959
Report on Development from July, 1958 to June, 1960	
International Astronomical Union	August 5, 1961
Commencement Address	June, 1964
Golden Bear Banquet	May 11, 1966

MINING, ENGINEERING AND GEOLOGY

Geological Factors in the Valuation of Mines	September-October 1939
The Valuation of Mines - Peru	1944
The Wasting Ores of a Small Planet	1945
A National Mineral Policy, Los Angeles Section of AIME	April 8, 1948
National Mineral Policies, Chamber of Commerce	April 28, 1948
Mineral Policy and Organization	July 31, 1948
Problems in Exploitation of the Multimetal Ore Deposits in Peru	April, 1949
Conservation of Mineral Resources	July, 1949
Research in the Mineral Industries	November, 1949
The Homestake Mine	1949
Security versus Opportunity, AIME	February, 1950
Engineers and Some Problems of the Time	May 30, 1950
Exploitation of Mineral Resources - Mineral Industries Symposium	September 8, 1952
Notes on Geologic Studies in Peru - In Honor of Jorge Broggi	1952
The Carlsbad Example	1952
Mineral Resources	February, 1953
Man's Selective Attack on Ores and Minerals	March 14, 1955
Stabilization of Uranium Production	December 16, 1957
Dedication of the Homestake-New Mexico Partners Mill	April 26, 1958
Engineering - A Career of Opportunity	February 23, 1961
Application of Geology	May 3, 1961
Opening Remarks at the Panel of the Committee on Natural Resources of the National Academy of Sciences	September 5, 1961

GOLD

The Future of Gold	Oct., 1946	published in The Mines Magazine
The Future of Gold	Nov., 1946	published in Mining Congress Journal
Gold Versus Inflation	Feb., 1948	published in Mining Congress Journal
Gold, Our Most Strategic Mineral - address at General Conference of Mineral Industries Colorado School of Mines	Sept. 30, 1949	
An Opportunity and a Duty	Jan. 17, 1950	
Gold Miners and Inflation	Nov. 1, 1950	
Gold and the National Economy East Texas Section of AIME	Nov. 22, 1950	
Gold Mining	Feb. 1951	published in Mining Congress Journal
Gold-Commonwealth Club Talk Palace Hotel, San Francisco	April 6, 1951	published in South African Mining and Engineering Journal
Lakeside Talk on Gold Bohemian Grove	July 17, 1951	
Gold and Mineral Strategy Town Hall, Los Angeles	Nov. 19, 1951	
Gold Mining in 1951		
Gold Mining under Current Conditions	Dec. 15, 1952	
Gold Mining in 1953		
Gold Mining Industry in 1953	Jan. 14, 1953	
Gold in a Free Economy - presented to an audience in South Dakota (2 different speeches with same title and date)	July 13, 1953	
The Proper Use of Gold Sun Valley, Idaho	July 16, 1953	
Gold and Gold Mining-American Institute of Consulting Engineers, N.Y.	Oct. 19, 1953	
Gold, Still our Monetary Metal Annual Joint Meeting of the San Francisco Engineering Council, San Francisco	Dec. 2, 1953	
Gold Mining in 1954		published in Mining Congress Journal
Gold Mining Industry in 1955	Jan., 1956	published in Commercial and Financial Chronicle
Gold and the Gold Mining Industry - San Francisco	Jan. 4, 1957	

Gold Mining Industry in 1957	Dec. 30, 1957	published in Commercial and Financial Chronicle
Gold in 1957	Jan. 2, 1958	
Gold Mining Industry in 1957	Jan. 5, 1958	
Business and Finance Speaks After Turn of the Year	Jan. 16, 1958	published in Commercial and Financial Chronicle
Gold Mining Industry in 1959	Feb., 1960	published in Mining Congress Journal
The Dollar Versus Gold- address before Economic Society of S. Africa and the Institute of Bankers Cape Town, S. Africa	March 10, 1960	published in Commercial and Financial Chronicle Jan. 12, 1961
Gold Situation for Sacramento	Dec. 9, 1960	
Draft of a Statement on Gold- AMC	Aug., 1961	
Why Not Use Gold AIME meeting, New York	Feb. 20, 1962	
The Many Uses of Gold AIME meeting, New York	Feb. 20, 1962	
The Gold Situation	Feb., 1963	published in the Mining Congress Journal
Gold and Education American Society of Civil Engineers, San Francisco	Oct. 11, 1963	
Gold and Education		
End Dual Standard for Domestic and Foreign Dollar-Columbia University (upon receipt of the Ambrose Monell Award)	June, 1964	published in Commercial and Financial Chronicle
Monetary Alchemy - address before Mile High Club of Denver	Jan. 23, 1967	
Monetary Alchemy	March 9, 1967	published in Commercial and Financial Chronicle
Monetary Facts and Fancies (rebuttal to Gold and the Dollar by W. F. Butler)	Jan., 1968	published in Mining Engineering
The Revaluation of Gold speech given at AIME, New York	Feb. 28, 1968	
Money and Precious Metals- Commodity Club, San Francisco	May 22, 1968	
Speech at Gold Seminar American Metal Market	June 24, 1968	
Gold and Monetary Order address before Federal Reserve Board of Minneapolis at Deadwood, South Dakota	Aug. 15, 1968	
Money and Precious Metals-II Commodity Club, San Francisco	May 8, 1969	

Gold and the Balance of Payments Commonwealth Club - San Francisco	Mar. 19, 1970
Currently Cherished Prejudices Berkeley Breakfast Club	Mar. 20, 1970
Speech before City Commons Club taped for transmission over KPAT	April 26, 1970
Speech given at Men's Dinner of St. Clement's Episcopal Church- Berkeley	May 14, 1970
Speech given at the Richmond Rotary Club on Gold	Jan. 15, 1971
Our Complex Institute - Unity in Spite of Diversity - AIME International Dinner, New York (on complexity of mining industry)	Feb. 26, 1971
Gold Versus Inflation Grove Room Talk, Bohemian Club	March 8, 1971
South Africa and Gold Commonwealth Club-San Francisco	May 26, 1971
Gold Mining in a Time of Currency Inflation	
Gold Mining - An Arbitrarily Depressed Industry	
Gold Mining - A Slave Industry	
Gold and Money	
Gold and Gold Mining	
The Price of Gold	

MISCELLANEOUS PRESENTATIONS

Proceedings of the 32nd Meeting, Harvard Alumni Bulletin	June 5, 6, 7, 1930
Harvard Chapel	March 25, 1940
Lon Hughes Interview of Donald H. McLaughlin	January 5, 1947
Professional Discipline Versus Liberal Vagueness	September, 1949
The Future of the Individual Under American Capitalism	May 18, 1950
Commencement Address, Montana School of Mines	May, 1950
Comments on Taxation and Inflation - AIME	October 24, 1951
The Complete Prospector, University of Wyoming Commencement	1953
Man's Use of His Planet, New Mexico Institute of Mining Commencement	June 4, 1954
The Education of a Professional, Colorado School of Mines Commencement	1955
Emphasis on Excellence	October 23, 1958
Graduation Exercises-Katherine Burke School	June 9, 1961
Donald H. McLaughlin-An Interview by Henry Carlisle	June, 1965
Commencement Address-Menlo School	June 4, 1965
An Age of Adventure, Commencement Address Anna Head School	June 10, 1966

APPENDIX III

LL.D. Citation
University of California at Berkeley
1966

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

IN RECOGNITION OF HIS MERITORIOUS ACHIEVEMENTS HAVE CONFERRED
THE DEGREE OF DOCTOR OF LAWS UPON

DONALD HAMILTON McLAUGHLIN

On the University's varied stage, he has in his time played many parts--student, alumnus, professor, dean, and regent. In each of them, his performance has been distinguished by intellectual style, enthusiasm, and devotion to the highest standards of education. As a Regent, he has consistently encouraged and contributed to orderly planning for the University's academic and physical development. In his professional life, he has won international recognition as mining geologist, engineer, adminstrator, and executive. The University salutes today a highly valued member and friend, and confers upon him its highest honor

IN WITNESS WHEREOF THIS DIPLOMA IS INSCRIBED WITH THE SIGNATURES OF THE PRESIDENT OF THE REGENTS AND THE PRESIDENT OF THE UNIVERSITY AND TO IT HAS BEEN AFFIXED THE OFFICIAL SEAL

GIVEN AT BERKELEY THIS ELEVENTH DAY OF JUNE IN THE YEAR OF OUR LORD
ONE THOUSAND NINE HUNDRED AND SIXTY-SIX
AND OF THIS UNIVERSITY THE NINETY NINTH

Edmund G. Brown
Governor of California and President of the Regents

Clark Kerr
President of the University

INDEX - Donald H. McLaughlin

Abrams, Jack, 32
Academic Senate, 74, 79
academic standards, 72. See also educational standards
Albright, Horace, 291
Alexander, Robert E., 51
Allen, Raymond, 70
Ambrosia Lake, New Mexico, 183
  uranium discovery, 241, 246
American Institute of Mining, Metallurgical, and Petroleum Engineers, 238
American Telephone and Telegraph Company, 275
Anaconda Copper Company, 18, 129, 154, 174
Apperson family, 24
architecture. See U.C. campuses
atomic energy, 254. See also Atomic Energy Commission
Atomic Energy Commission, 184-186, 201, 280
  Advisory Committee on Raw Materials, 244-248
  metallurgical studies, 250
  nuclear power, 239-240, 252-253
  Plowshare Advisory Committee, 231, 254-260
  radioactivity, 185, 259
  and the University of California, 260-265
  uranium contracts, 241-242, 252
atomic tests:
  Four Corners, New Mexico, 258
  Gasbuggy, New Mexico, 257
  Rulison, Colorado, 257
Audubon Society, 200

Barcroft, Joseph, 107
Bascom, Willard Newell, 255
Bateman, Alan, 88, 96
Beatty, Chester, 201
Bechtel, Stephen D., Sr., 84-85
Becket, Welton, 47
Beltran, Pedro, 124
Berkeley campus. See University of California, Berkeley
Bernstein, Ed, 212, 233
Bernard Plan, 39-41
Bjorge, Guy N., 100, 191
Black Hills, ~~North~~ South Dakota, 18, 161, 164-168, 183, 247. See also Homestake Mine

Blackmun, Harry A., 60
Bohemian Grove, 28, 57
Boutwell, John M., 106, 155
Bradbury, Norris, 264
Bradford, Bob, 151
Bradford, Harriet, 26-27
Breck, Henry, 35
Bryan, Kirk, 158
Burns, Arthur, 214, 221
Bush, Vannevar, 276, 279
Busschau, Dr. William, 235

Calvin, Melvin, 46, 293
Campbell, Douglas, 91
Campbell, William W., 66
Canadian Shield, 266
Carter, Ed, 73, 76
Case Pomeroy & Company, 199, 201-202
Case, Walter, 201-203
Castlewood Country Club, 15, 17. See also Hacienda del Pozo de Verona
Cerro de Pasco Copper Corporation, 26, 106, 109, 177, 213
  financial problems, 188
  financing, 125-126
  compared with Homestake Mining Company, 174-176
  organization of, 124-126
  and syndicate, 113-116
Cerro de Pasco, town of, 107-108, 111, 116-117, 120-122
Chamber of Mines, The (South Africa), 231-232
Christy, Dean Samuel B., 30-31
Church, Tommy, 43, 48
Ciampi, Mario, 46
Clark, Edward H., 25-27, 106, 125, 152, 155, 167-168, 170-171, 173-177, 201. See also Homestake Mining Company; Cerro de Pasco Copper Corporation
Clark, Edward H., Jr., 25, 104, 173
Clark, Gordon Lindesay (Sir Gordon), 202
Clark, Helen, 25, 173
Coblentz, Bill, 56
Colorado plateau, 185, 245, 250-251
Committees. See Regents Committees
Comstock. See mines
Conant, James B., 82, 153, 276, 279, 281
Connally, Joseph, 157
Connick, Bob, 70
Consolidated Gold Fields of South Africa, 235
Coolidge, President and Mrs. Calvin, 193
Coon Butte, Arizona, 267
copper mines, 93-100. See also mines
Copper River Basin, 88, 94
Corley, Jim, 83

Courtney, Philip, 234
Cranmer, George, 199-201
Cranmer, Jean Chappell [Mrs. George], 199, 201
Cranmer Park, Denver, 199

Dailey, Gardner, 44, 51
Daily Californian, 90
Daley, Marcus, 162
Daly, Reginald A., 37, 92, 103, 158. See also Harvard
Davies, Paul, 85
Davis, Angela, 87
Davis campus. See University of California, Davis
Davis, William Morris, 158
De Gaulle, Charles, 211, 220
de Golyer, Everett, 244
DeMonte, Louis, 41
Depression, 214, 223
Deutsch, Monroe, 60
Dillingham, George, 117
Doolittle, Jimmy, 255
Douglas, Lewis, 179-180
duBridge, Lee, 279, 281
Dutton, Fred, 56

earthquakes:
  and atomic explosions, 257
  California, 136-139, 147, 270
  and drifting continents, 269
  Pacific Belt of Fire, 138-139
  Peruvian, 1970, 132-136
  San Francisco, 1906, 8-9
  U.S. Geological Survey, 292
Eastham, Vonnie, 27-28
Easton, Stanly, 32
Eaton, Ralph, 90, 103
Eckhard, Eleanor [Mrs. Donald McLaughlin], 150
Educational Policy. See Regents Committee on Educational Policy
educational standards, 52-56
Emminger, Otmar, 212, 233
Esberg, Milton H., Jr., 85

Farquharson, David, 4
Fenston, Earl [nee Fenstermacher], 90
Fermor-Hesketh family, 172
Field, Thorold, 201-202, 244
Fielder, Mildred, 167, 193
Fletcher, Katherine, 85

Flint, Ann Apperson [Mrs. Joseph Marshall], 26-27
Flint, Dr. Joseph Marshall, 26-27
Frankfurter, Felix, 59-60
Fraser, Horace, 157, 266
Frederick Sheldon Travelling Fellowship, 91
Free Speech Movement [FSM], 66, 68-69, 77-78
  Academic Senate, 79
  McLaughlin's viewpoint, 77-82
  violence, 80

Gardner, David P., 85
Gates, Eleanor, 11
geology:
  developments in (recent), 268
  geological history, 139-142
  problems:
    in Peru, 108
  sleuthing, 142-146
  theories:
    asteroids and minerals, 145, 267
    Continental Drift, 146-147, 268-269
    magma, 145
  use of in mines, 118
General Electric Company, 275
Giannini, Mario, 56, 84
Gilbreth, Lillian, 5
gold, 204-233
  in Australia, 201-202
  bullion, 230
  categories of hoarding, 218-219
  coins, 229-230
  conferences on gold and world monetary problems, 233-236
  Far-Eastern Rand, 202-203
  History of, early California, 216-218
  Karroo System, 202
  and monetary system, 203-233
  nuggets, 230-231
  policy, 233
  Spanish tide, 216
  standard, 205, 222-225, 236, 278
  Two-Tier System, 207
Goodman, Michael, 41, 46, 293
Goss, John, 178
Grant, U.S., IV, 92
Graton, Louis Caryl, 37, 89, 94-96, 116, 154-156, 265, 274-275
  students and associates of, 157-159
Grier, T. J., 30
Griggs, David, 157
Grunsky, Clotilde [Taylor], 35

Gulick, Esther, 200
Gustafson, John, 154, 178-179, 186, 202, 244, 246, 250

Hackett, Nelson, 90
Hacienda del Pozo de Verona, 1, 4, 8, 12-21, 25. See also Castlewood Country Club; Phoebe Hearst
Haggin, J. B. [James Ben Ali], 18, 110, 114, 160, 166, 170-172, 175
Haggin, Louis, 110, 170-171, 174
Hamlin, Dr. O. D., 3
Hamlin, Judge Oliver, 3
Harder, James, 191
Harvard:
  enrollment level, 52
  geology courses, 37, 92
  presidents, 82
  professors: Daly, Reginald A., 37, 158; Graton, Louis C., 23, 37; Palache, Charles, 158
Head, Anna [School], 6-7
Hearst, George, 4, 17-18, 21, 110, 125, 160-168, 170-172
Hearst, Phoebe [Mrs. George], 1-2, 4, 8, 10, 13-14, 17-19, 23-27, 30, 34, 39, 106, 171
  Phoebe Apperson Hearst Society, 27-28
Hearst, Millicent [Mrs. William Randolph], 25
Hearst, William Randolph, 21-22, 83, 166, 171
Heimbucher, Cliff, 179
Heller, Ellie [Elinor], 73, 76, 286
Henshaw, Paul, 154
Heyns, Roger, 62-64, 70, 81
Hildebrand, Joel, 274
Hitch, Charles J., 61
Hoffman, Robert, 158
Holloway, Jack, 235
Homestake Mining Company, 21-22, 26, 113, 125, 152-153, 201-202, 214-215, 244
  Board of Directors, 177-182
  compared with Cerro de Pasco, 174-176
  formation and early times, 160-168
  hiring practices, 194-196
  management aspects, 170-174
  in Peru, 127, 135
  reassessment of, 168-169
  and unions, 189-194
  and uranium, 241
Hoover Commission:
  Committee on National Resources, 288
Hoover, Herbert, 28-29, 32, 214
Hosted, J. O., 169
Howard, John Galen, 4, 39-40, 44
Howard, Sidney, 90-91, 104
Hughes, Charles Evans, 60
Hume, Sam, 90

International Monetary Fund, 208, 214, 233
Irvine campus. See University of California, Irvine

Jackling, Daniel C., 93, 95, 97
Joralemon, Ira, 178-179

Kelham, George W., 40
Kellar, Chambers, 173
Kellar, Kenneth, 179
Kennedy, George, 157
Kerr, Clark, 36, 41-42, 48, 52, 66-68, 70, 92
Kerr, Kay [Mrs. Clark], 200
Kern County Land Company, 176
Keynes, Maynard, 203
Kingsmill, Harold, 177
Klopsteck, Paul, 280
Knight, Goodwin, 286
Koenig, Robert, 157
Koshland, Daniel, 85
Kropp, Miriam [Mrs. Pedro Beltran], 124

Landis, Ann [Mrs. Charles McLaughlin], 152
Lane, Agnes [Leonard], 26
Larsen, Esper, 88-89, 158
Laski, Harold, 59
Lawrence, Ernest, 263, 275
Lawrence Radiation Lab [AEC], Berkeley, California, 254, 260-261, 264, 280
Lawson, Andrew C., 31, 37, 206
LeConte, Joseph N. ["Little Joe"], 32
Levering Act (State of California), 86
Lewis, John L., 192
Libby, Willard, 255
Lindgren, Waldermar, 159
Lindsay, John, 89
Livermore Laboratory [AEC], Livermore, California, 254, 260-261
Loeb, Robert, 279
London, Jack, 39
Los Alamos [AEC], New Mexico, 254, 260-261, 264, 280
Los Angeles campus. See University of California, Los Angeles
Loyalty Oath, UC, 57, 65, 83-87
Luckman, Charles, 51

McCaffrey, Stanley E., 85
McCune, 110, 113, 174
McHenry, Dean E., 48
McKinley School (Berkeley, California), 6
McKinstry, Hugh, 158, 202

McLaughlin, Charles, 151-152
McLaughlin, Donald:
  family, 1-4, 10, 25, 150-152, 199-201
  education:
    elementary, 56; high school, 8-9; college, 14-15, 28, 30-36; graduate, 37, 88-91
  army service, 91, 101-106
  as professor:
    at UC Berkeley, 33
    at Harvard, 72, 150
  as geologist at Cerro de Pasco, 107, 115-118, 120
  as geologist at Homestake, 173-174
  as director of Homestake, 176
  as Regent, 39-87
    appointment as, 57
  observations concerning:
    Board of Regents, 285-287
    educational standards, 52-56
    equity of profit distribution in developing countries, 98-99, 188-189
    freedom of speech, 58
    Free Speech Movement, 67-70, 77-82
    gold and the monetary system, 204-207
    inflation, 277-279
    management of large enterprises, 180-182
    Oath Controversy, 84
    Ph.D.'s, 282-285
    tenure, 281-282
    tuition, 56
McLaughlin, Donald, Jr., 151-152
McLaughlin, Elizabeth, 1
McLaughlin, George, 4, 94, 200
McLaughlin, Jeanie, 4, 7, 21, 200
McLaughlin, Katherine Hamilton, 1-3
McLaughlin, Mary Frances, 1, 3-4
McLaughlin, Sylvia, [Mrs. Donald H.], 25, 199-200
McLaughlin, William Henry, 1, 3

magnesium, 228
Maybeck, Bernard, 2, 40, 48-49
Meiggs, Henry, 110, 114
Mein, Will, 32
Merrill, Charles, 32
metals:
  demand for, 271
  uses of, 272
Meyer, Charles, v-vi, 155, 157
Meyerson, Martin, 63

mines:
in Australia:
Kalgoorlie Gold Mines, 202
Norseman Mine [gold], 202
Sons of Gwalia [gold], 28
in Canada:
Great Bear Lake [uranium], 245
Sudbury [Ontario (INCO) nickel/copper], 145, 159, 265-267
Thompson [Manitoba - nickel], 144, 265
in Mexico:
San Luis Mine [Durango - silver/gold], 21, 153
in Peru:
Casapalca, 119
Cerro de Pasco Mine [copper, silver and others], 112, 118-123, 135
Magistral [copper], 132
Minas Ragra, 115
Morococha, 119
Yauricocha, 119
in South Africa:
Evander [gold], 203
Kimberly Diamond Mines, 32
Roan Antelope Mine [copper], 98, 201
Shinkolobwe Mine [Belgian Congo-uranium], 245
in the United States
Anaconda Mine [Butte, Montana - copper], 18, 162
Bunker Hill [Idaho], 33, 202
Climax Molybdenum Mine [Colorado], 32, 175-176
Empire Mine [Grass Valley, California - gold], 30
Hauber Mine [Wyoming - uranium], 183
Homestake Mine [Black Hills, South Dakota - gold], 19, 113, 140, 189, 200, 208, 247-248
LaSall Mine [Moab, Utah - uranium], 183
Magma Mine [Superior, Arizona - copper], 100, 113, 178
Mi Vida [Moab, Utah - uranium], 183, 246
Newmont [Carlin, Nevada - gold], 174-175
North Alice Mine [Moab, Utah - uranium], 183
North Star Mine [Grass Valley District, California - gold], 30
Ophir [Comstock, California - gold], 18, 160
Ontario Mine [Park City, Utah - silver/lead], 18, 106
Phelps-Dodge [Bisbee, Arizona - copper], 180
United Verde Extension [Jerome, Arizona - copper], 180
See also mining; Mining Corporations and Companies; ores
mining:
claims, 242, 289-291
College of (UC Berkeley), 33
development of in foreign countries, 98-100, 113, 115, 129-131
financing problems, 187
development of in Peru, 128-131
engineering education, 32
use of geology in, 118

hazards, 192
metallurgy, 118, 163
methods of:
bovedones (Tajo Mata Gente), 112; use of Cornish pump, 109; patio process, 108-109; pit, 93; prospecting (modern), 225; for potash, 197; removal of water, 111.
modification of laws, 288-291
as a profession, 33
Secondary Enrichment Investigation, 94-96, 155
schools of, 34
See also ores; mines; Mining Corporations and Companies
Mining Corporations and Companies:
American Metal Climax, 175, 187
American Metal Company, 175-176
American Smelting and Refining, 174, 188
Anaconda Copper Company, 18, 97, 129, 154, 174, 246
Cerro de Pasco Copper Corporation (see individual listing)
Chile Copper Company, 213
Cia Minera de Buckus and Johnson (Peru), 115
Cie des Mines de Huaron (Peru), 115, 167
Cie de Mines du Haut Katanga (Africa), 98, 245
Falconbridge Mining Company, 145, 158, 266
Hanna Company, 179
Homestake Mining Company (see individual listing)
Homestake-Sapin, 183, 246
International Minerals Company, 197
International Nickel Company, Sudbury, Ontario, 145, 159, 180, 226, 248, 265-266, 275
Kennecott Copper Corporation, 88, 93, 95, 97, 215, 260
Kerr-McGee Company, 246
Magma Company, 178
Morococha Mining Company, 115, 119
Newmont Mining Company, 174-175, 215, 244
Phillips Petroleum, 246
Sabre Pinon Company, 183
San Luis Mining Company, 21, 176-178
Southern Peruvian Copper Company, 187
Sullivan Company, 33
Swift and Company, 196
Texas Gulf Sulphur, 196, 226
Union Carbide Company, 247
Union Corporation (South Africa), 203
United States Borax, 196
United States Vanadium, 247, 251
Utah Copper Company, 93, 97
Vanadium Corporation of America, 251
See also ores; mines; mining
monetary policy, 222
Morgan, Julia, 17, 40
Mt. Blackburn, 88, 93
Mrak, Emil, 61-62

Murdoch, Joseph, 157
Murphy, Franklin, 62
Murray, William W., 25

National Mineral Advisory Council, 288
National Science Foundation & National Science Board, 274, 276-277, 280
Neylan, John Francis, 76, 83, 263
Nixon administration, 214
Nixon, Pat, 97
Noble, Jim, 154
Nolan, Thomas B., 291
Nome, Alaska:
  gold rush, 228

Oath Controversy, 65, 83-87, 286
Oliver, Ed, 32
Olson, Culbert, 286
Oppenheimer, Robert, 263
ores:
  bismuth, 112
  copper, 88, 94-100, 109, 112, 187, 272
  formation of deposits, 139-142
  gold, 28, 112, 153, 178, 189, 196, 203, 250, 272
  lead, 18, 112, 187, 196
  lead/zinc/silver, 110
  magnesium, 228
  molybdenum, 174-176
  nickel, 144, 202
  nickel/copper, 266
  platinum, 219-222, 272
  potash, 196-198
  prospecting for, 226
  silver, 18, 112, 153, 178, 219
    pocos, 108, 118
    bonanza, 108
  uranium, 182, 183-186, 196, 202, 239, 247, 250-254
  vanadium, 115, 247, 251
  zinc, 112, 187
  See also mines; Mining Corporations and Companies

Page, Sidney, 169
Palache, Charles, 88, 158
Park, Charles, 179
Pauley, Ed, 286
Pereira, William L., 49, 50-51
Peru:
  copper mines, 108-123
  electric development in, 134-135

Lima, 123-124
railroad development in, 110, 114
Pike, Sumner, 201, 244
Pleasanton Water, 37-38
Spring Valley Water Company, 17, 38
See also Hacienda del Pozo de Verona
Potter, Dean, 280
Pratt, Wallace, 244
Probert, Frank H., 33

Railroad, Central, of Peru [Ferrocarril Central del Peru], 110, 114-115
Rawlings, Stuart, 33
Rickenbacher, Eddie, 91
Robinson, W. S., 202
Rockwell, Alvin, 179
Roosevelt, Franklin D.:
gold pricing, 169
and inflation, 208
Rueff, Jacques, 211-212, 233, 236-237. See also gold and monetary system
Rutledge, Philip Casteen, 255

Sales, Reno, 154
Salisbury, O. J., 177-178
Sangier, Edgar, 245
San Simeon, 17, 22
well curbing, 13
Santa Barbara oil spill, 292
Save-the-Bay Association, 25, 200
Savio, Mario, 68
Schweinfurth, A. C., 15
Searls, Fred, 174, 244
Shoemaker, Abbott, 191
Simon, Norton, 286-287
Simpson, John, 85
Smythe, Henry L., 116
South Africa:
production of gold in, 98, 215
Spring Valley Water Company. See Pleasanton Water
Sproul, Allan, 203
Sproul, Marian [Mrs. Vernon Goodin], 124
Sproul, Robert G., 33, 40, 52, 60, 65-68, 72, 74, 82-83
Steen, Charlie, 183-184, 242. See also uranium
Steinhart, Jesse, 86
Stephens, Henry Morse, 23, 106
Steward, Walter, 201
Strong, Ed, 63, 69, 82
Swent, J. W., 177-178

Taft, Robert A., 194
Taft, William Howard, 60, 194
Teller, Edward, 255, 261, 263-264
Tevis, Lloyd, 160, 166
Thompson, John Fairfield, 265
Thorp, Willard L., 211
Tolman, Edward, 86
Traynor, Roger, 59
Trevethick (Cornish engineer), 109
Triffin, Robert, 212, 233
Tully, Richard Walton, 11
Tunell, George, 89, 157

Underhill, Bob [Robert M.], 263-264
U. S. Geological Survey:
  Advisory Committee, 291-292
United Mine Workers, 189-192
United Steel Workers, 189-193
University of California, Berkeley:
  and the Atomic Energy Commission, 260-265
  architecture of, 39-48
  chancellors, 60
  Hearst Mining Building, 39
  presidents, past and present, 82
  regents. See UC Regents
  tuition, 56
University of California, Board of Regents:
  appointment of Chancellors, 62-66
  committees:
    Academic Senate, 62
    Buildings and Grounds, 6, 36, 41, 44-45, 51, 73
    Committee on Committees, 64-65, 76
  educational policy, 72-77
  scholarships, 71
  terms of, 90
University of California, Davis:
  architects, 51
University of California, Irvine:
  architect, 49-51
University of California, Los Angeles:
  architect, 47
University of California, Riverside, 72-74, 89
University of California, Santa Barbara, 51, 72
University of California, Santa Cruz, 47-48, 50
uranium, 182-183, 239, 241

Vanderwilt, John, 157
Vedder, Elihu, 11
Vedenesky, Dmitri, 179

Wadsworth, Ralph, 35
Warne, Harriet [Mrs. Donald McLaughlin, Jr.], 151
Warnecke, Jack, 45-48, 50
Warren, Earl, 57-59, 286
Waterman, Alan, 280
Wegener, Alfred, 270
Wheeler, Benjamin Ide, 2, 23, 39, 66
Wheeler, Benjamin Webb, 90
Williams, Gardner, 32
Wilson, Woodrow, 103
Wingate, Harry, 265
Witwatersrand, South Africa, 202-203, 227, 249
Woods, Baldwin M., 32
World War I; officers training, 101-102
Wrangell Mountains, 88, 93-94
Wright, Lawrence B., 167, 169
Wurster, Bill, 41-43
Wyntoon, Canada, 22, 25, 49

Yates, Arthur, 167, 169
Yates, Bruce, 173, 191

Harriet Siegel Nathan

Graduated from the University of California, Berkeley, in 1941 with an A.B. in Journalism.
Was assistant women's editor and managing editor of The Daily Californian, then known as the Monarch of the College Dailies.
Prepared President Sproul's biennial report to the legislature, 1942-44; wrote advertising copy; edited house journals; served on local and state boards of the League of Women Voters, primarily in the fields of local and regional government and publications.
Returned to U.C. for a Master of Journalism degree in 1965.
Wrote for the University's Centennial Record.
Now doing research, writing, and editing for the Institute of Governmental Studies, U.C., Berkeley.

12 6 6 8 5

Berkeley
LIBRARY OF THE UNIVERSITY OF CALIFORNIA

Berkeley
LIBRARY OF THE UNIVERSITY OF CALIFORNIA